SPECIAL SCIENCE QUIZ IN THIS ISSUE!

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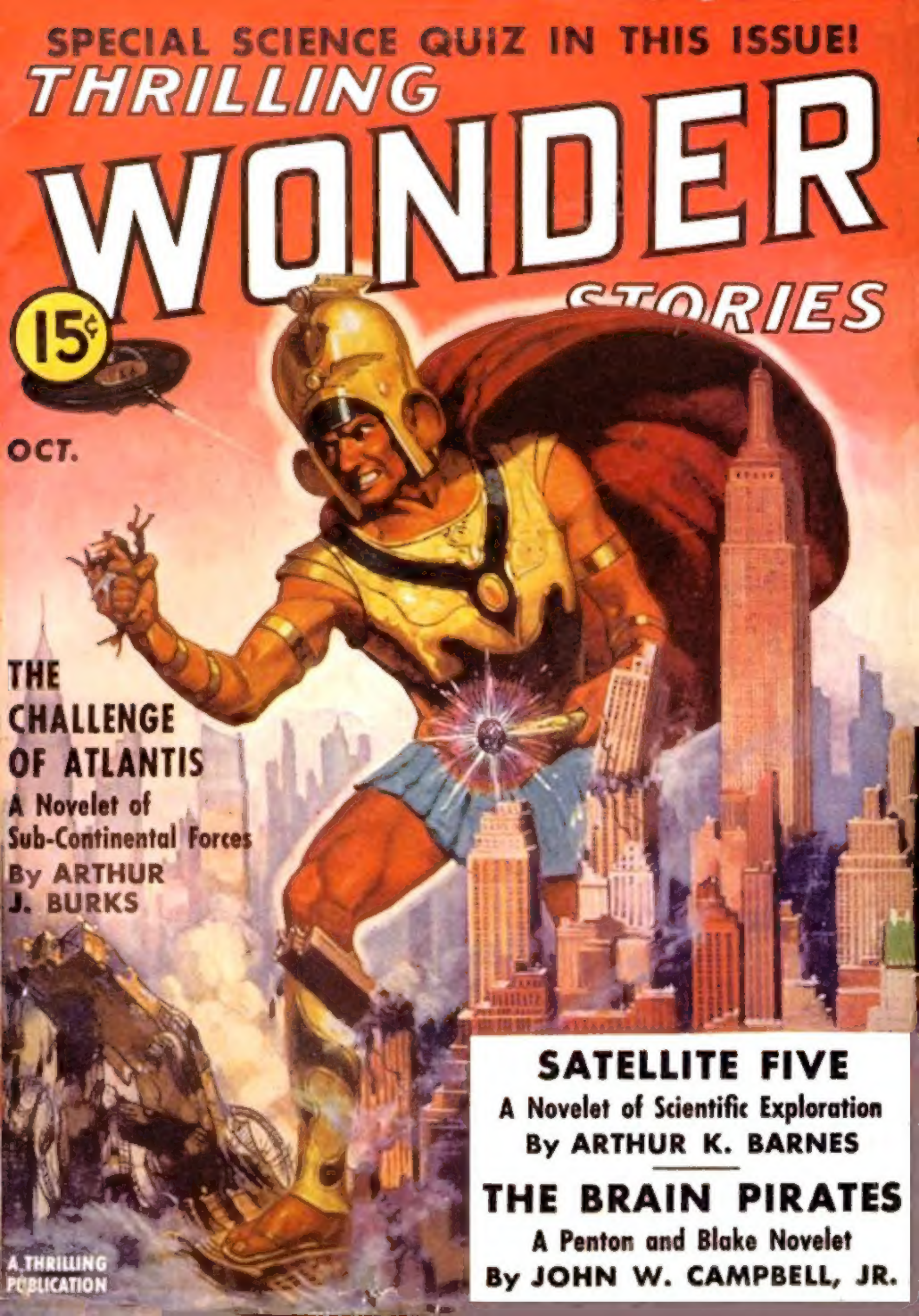

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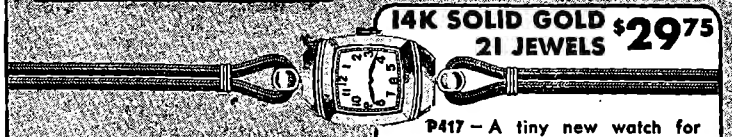

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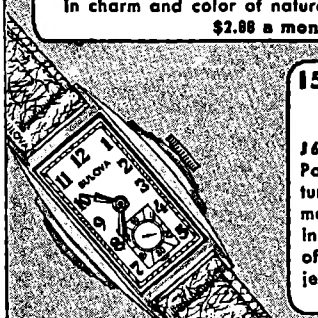

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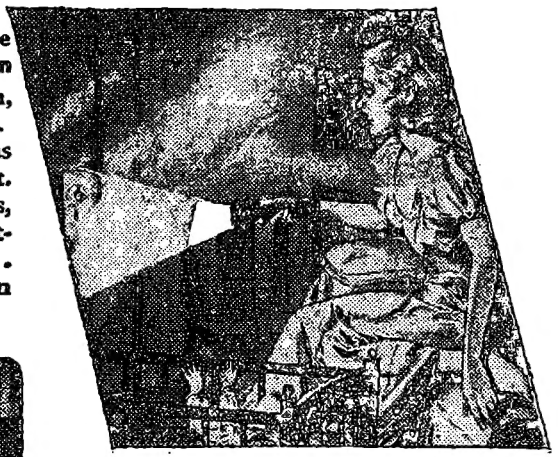
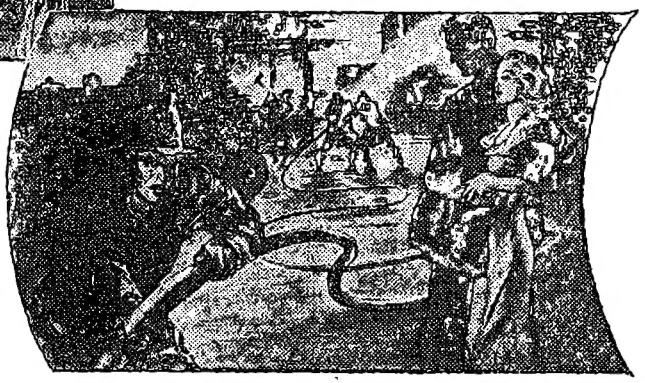
Their Home in Flames the Sweetman Family Slept on

1. Arthur E. Sweetman, of 336 Durham Ave. Metuchen, N. J., still has his "Eveready" flashlight. It's still working, he says, with the original batteries in it. He lost everything else he owned... and but for the flashlight, his wife, his baby son and he would have lost their lives as well.



2. "My wife waked out of a sound sleep when the baby coughed," writes Mr. Sweetman, "and picked up our flashlight from a chair by the bed as she got up. In its bright beam smoke was curling under the bedroom door!



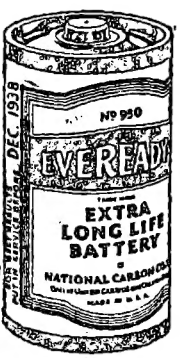
3. "Quickly, we wrapped the baby in blankets and climbed out the window just as the room burst into flame.

4. "Safe! But there we stood shivering in our night clothes watching everything else we owned burn up.

5. "Not quite everything, however. Firemen found the flashlight still burning where my wife had dropped it in that flaming bedroom... and because it, and those *fresh* DATED 'Eveready' batteries saved us from a living cremation, I shall treasure it all my life.

(Signed)

Arthur E. Sweetman"



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The Magazine of Prophetic Fiction

VOL. XII NO. 2

October, 1938

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A Prehistoric Novelet
By
CLIFFORD D. SIMAK

TIDAL MOON
An Interplanetary Story
By
STANLEY G. WEINBAUM
and
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A Novelet of a Floating World
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ON THE COVER

The cover painting depicts a scene from OF JOVIAN BUILD, a story by Oscar J. Friend which appears in this issue.

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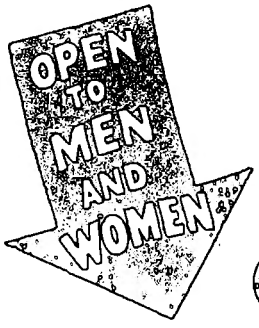

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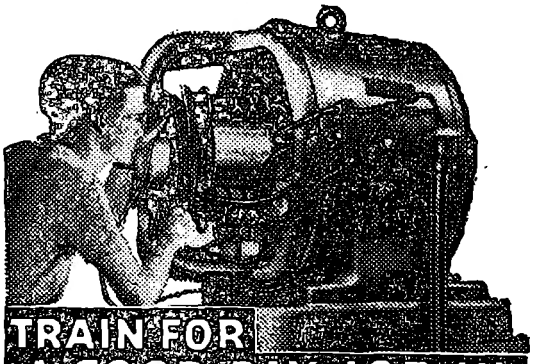

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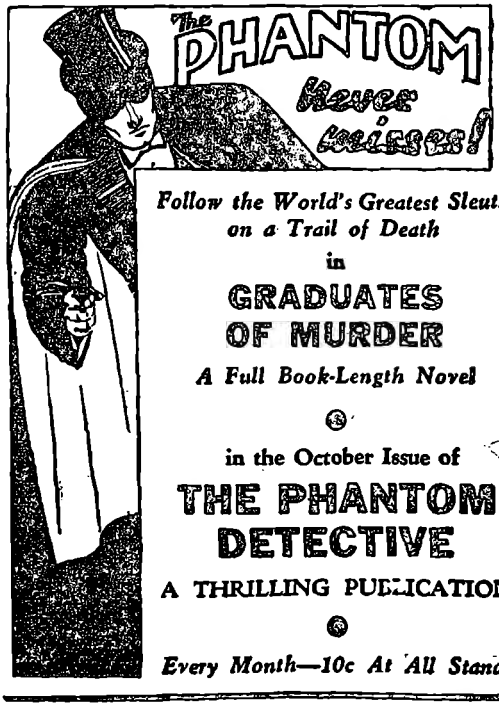

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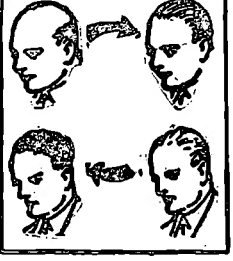

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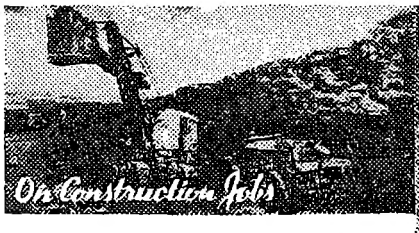

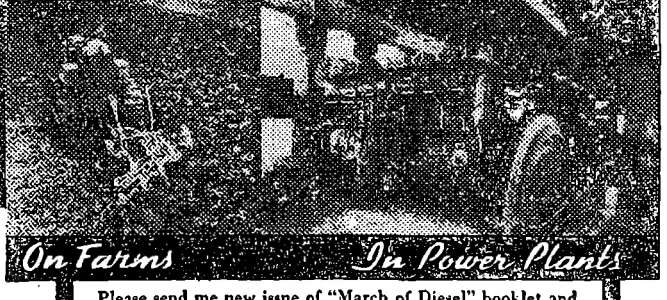

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EARNINGS

One man in California earned over $1,600 per month for three months—close to $5,000 in 90 days' time. Another writes from Delaware—"Since I have been operating (just a little less than a month of actual selling) and not the full day at that, because I have been getting organized and had to spend at least half the day in the office; counting what I have sold outright and on trial, I have made just a little in excess of one thousand dollars profit for one month." A Connecticut man writes he has made $55.00 in a single day's time. Texas man nets over $300 in less than a week's time. Space does not permit mentioning here more than these few random cases. However, they are sufficient to indicate that the worthwhile future in this business is coupled with immediate earnings for the right kind of man. One man with us has already made over a thousand sales on which his earnings ran from $5 to $60 per sale and more. A great deal of this business was repeat business. Yet he had never done anything like this before coming with us. That is the kind of opportunity this business offers. The fact that this business has attracted to it such business men as former bankers, executives of businesses—men who demand only the highest type of opportunity and income—gives a fairly good picture of the kind of business this is. Our door is open, however, to the young man looking for the right field in which to make his start and develop his future.

Not a "Gadget"— Not a "Knick-Knack"—

but a valuable, proved device which has been sold successfully by business novices as well as seasoned veterans.

Make no mistake—this is no novelty—no flimsy creation which the inventor hopes to put on the market. You probably have seen nothing like it yet—perhaps never dreamed of the existence of such a device—yet it has already been used by corporations of outstanding prominence—by dealers of great corporations—by their branches—by doctors, newspapers, publishers—schools—hospitals, etc., etc., and by thousands of small business men. You don't have to convince a man that he should use an electric bulb to light his office instead of a gas lamp. Nor do you have to sell the same business man the idea that some day he may need something like this invention. The need is already there—the money is usually being spent right at that very moment—and the desirability of saving the greatest part of this expense is obvious immediately.

Some of the Savings You Can Show

You walk into an office and put down before your prospect a letter from a sales organization showing that they did work in their own office for $11 which formerly could have cost them over $200. A building supply corporation pays our man $70, whereas the bill could have been for $1,600! An automobile dealer pays our representative $15, whereas the expense could have been over $1,000. A department store has expense of $88.60, possible cost if done outside the business being well over $2,000. And so on. We could not possibly list all cases here. These are just a few of the many actual cases which we place in your hands to work with. Practically every line of business and every section of the country is represented by these field reports which hammer across dazzling, convincing money-saving opportunities which hardly any business man can fail to understand.

Profits Typical of the Young, Growing Industry

Going into this business is not like selling something offered in every grocery, drug or department store. For instance, when you take a $7.50 order, $5.83 can be your share. On $1,500 worth of business, your share can be $1,167.00. The very least you get as your part of every dollar's worth of business you do is 67 cents—on ten dollars' worth $6.70, on a hundred dollars' worth $67.00—in other words two thirds of every order you get is yours. Not only on the first order—but on repeat orders—and you have the opportunity of earning an even larger percentage.

This Business Has Nothing to Do With House to House Canvassing

Nor do you have to know anything about high-pressure selling. "Selling" is unnecessary in the ordinary sense of the word. Instead of hammering away at the customer and trying to "force" a sale, you make a dignified, business-like call, leave the installation—whatever size the customer says he will accept—at our risk, let the customer sell himself after the device is in and working. This does away with the need for pressure on the customer—it eliminates the handicap of trying to get the money before the customer has really convinced himself 100%. You simply tell what you offer, showing proof of success in that customer's particular line of business. Then leave the invention without a dollar down. It starts working at once. In a few short days, the installation should actually produce enough cash money to pay for the deal, with profits above the investment coming in at the same time. You then call back, collect your money. Nothing is so convincing as our offer to let results speak for themselves without risk to the customer! While others fail to get even a hearing, our men are making sales running into the hundreds. They have received the attention of the largest firms in the country, and sold to the smallest businesses by the thousands.

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In trying this business out. You can measure the possibilities and not be out a dollar. *If you are looking for a business that is not overcrowded*—a business that is just coming into its own—on the upgrade, instead of the downgrade—a business that offers the buyer relief from a burdensome, but unavoidable expense—a business that has a prospect practically in every office, store, or factory into which you can set foot—regardless of size—*that is a necessity* but does not have any price cutting to contend with as other necessities do—that because you control the sales in exclusive territory is your own business—*that pays more on some individual sales than many men make in a week and sometimes in a month's time*—if such a business looks as if it is worth investigating, *get in touch with us at once* for the rights in your territory—don't delay—because the chances are that if you do wait, someone else will have written to us in the meantime—and if it turns out that you were the better man—we'd both be sorry. So for convenience, *use the coupon below*—but send it right away—or wire if you wish. But do it now. *Address*

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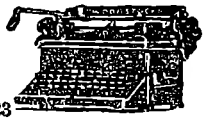

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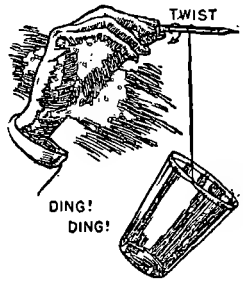

With a thread about 18" long, an ordinary water glass is tied to a round wooden pencil. The loop around the pencil is made loose enough to slip. When the pencil is turned ever so slightly the glass emits a loud "ting." This enables the performer to claim that his "mystic glass" can answer all questions — giving two sounds for "yes" and one sound for "no." Imperceptibly turning the pencil to get the desired responses, the performer amazes all! Try it yourself.

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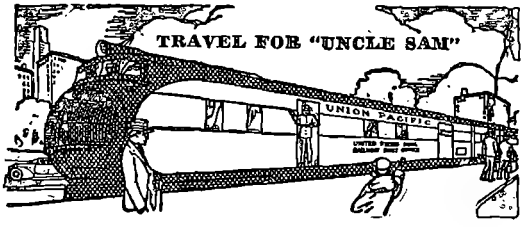

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Author of "The Hothouse Planet," "The Dual World," etc.

CHAPTER I

Cacus

TOMMY STRIKE let out a startled squawk and tried to leap aside. Then suddenly his legs folded limply beneath him, and he crashed to the floor.

"Blast it!" he howled at the man behind the desk. "Turn that thing off! You've crippled me for life!"

The man behind the desk was past middle age, with rabbitlike eyes staring through thick lenses. On the desk-top before him rested a lead-gray box, the interior of which consisted of a bewildering array of weird tubes and coils. There was a portable power unit, and a

The Cacus, bulgy-eyed, crouched angrily at the door

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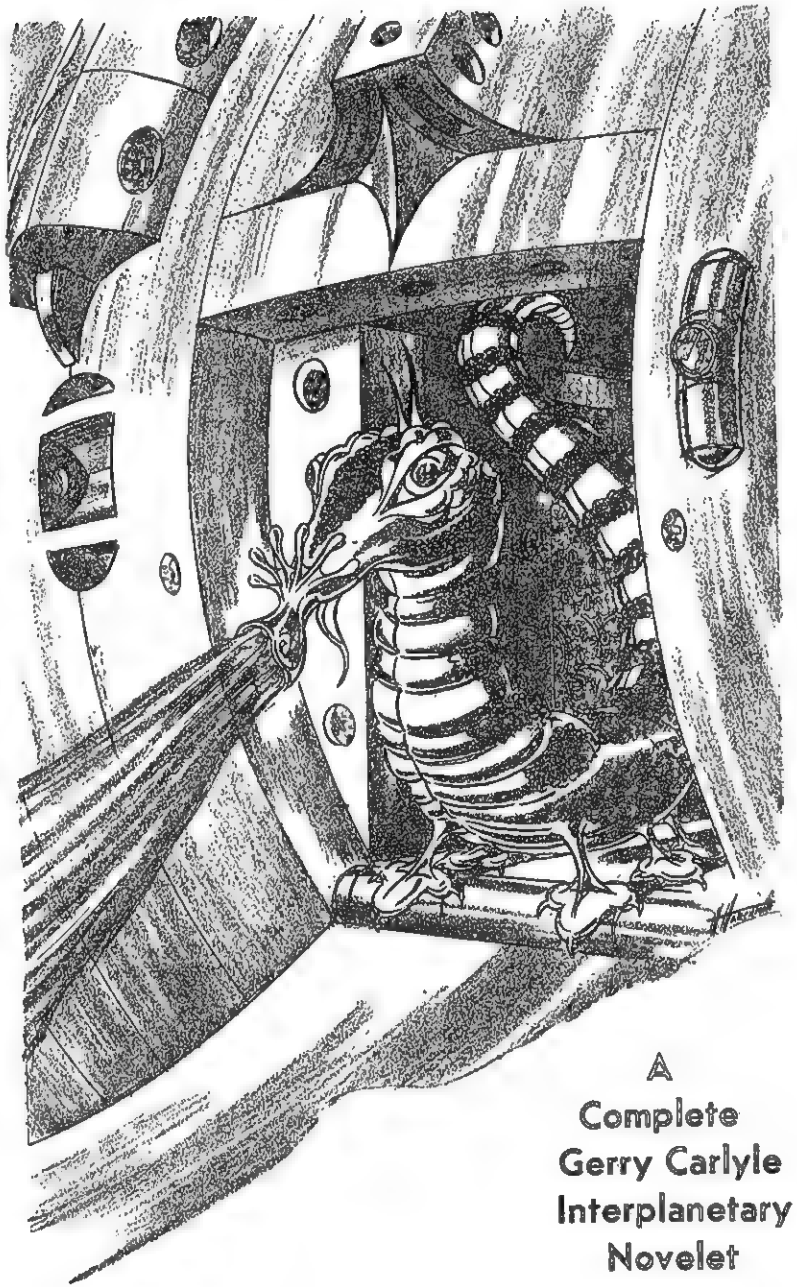

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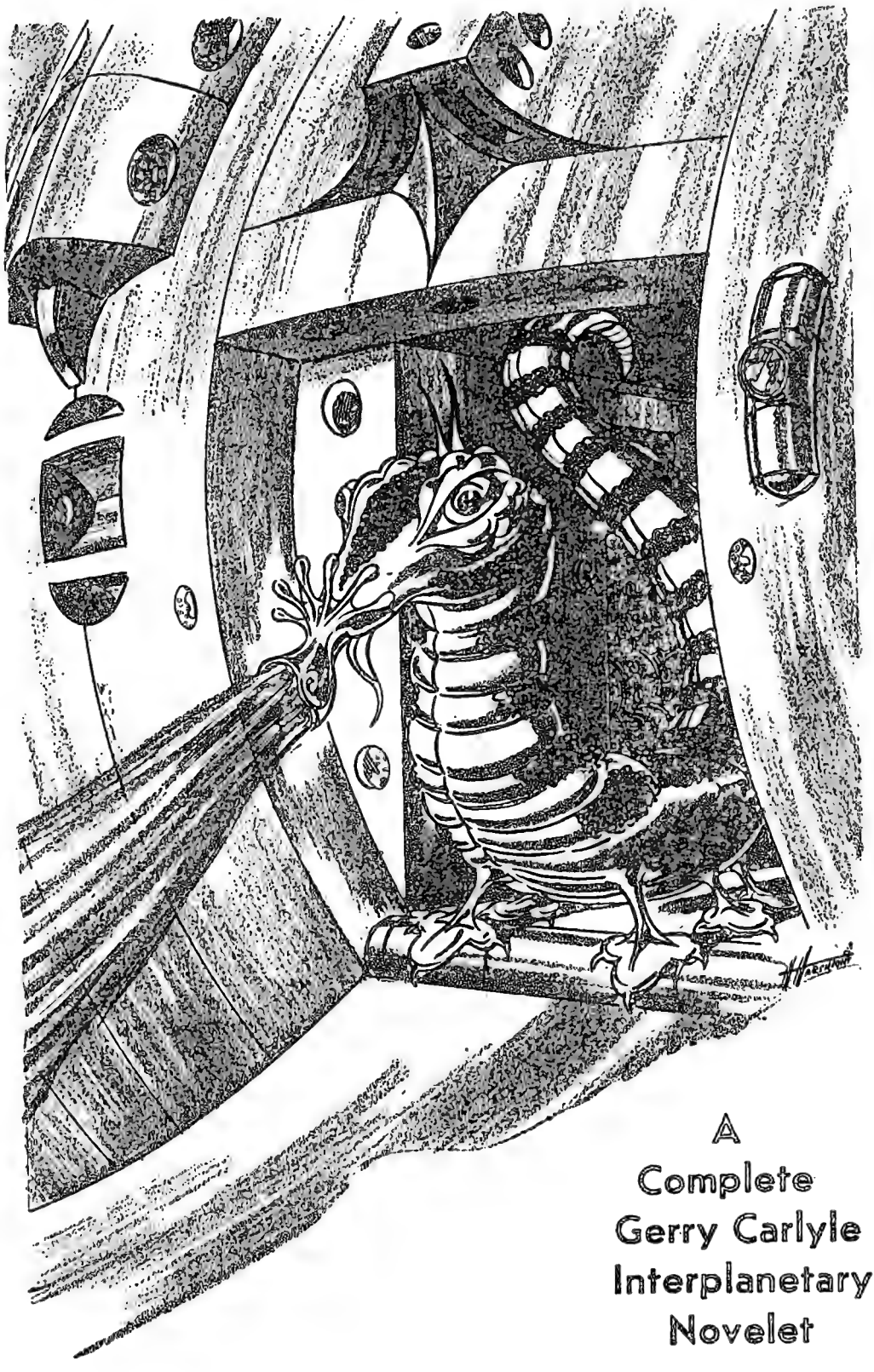

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cameralike lens now focused on Strike's lower body. The man fumbled for the activating switch, snapped it off.

"Oh—so sorry, Mr. Strike. No harm intended. Just checking my—er—apparatus, seeing that it's in working order." He said much but explained nothing.

Strike reassured himself that his legs were still sound, then advanced on the older man, who retreated around the desk in alarm with apology very plain on his face.

"I've never struck a man as old as you," Strike said grimly, "but so help me, I've a good notion to clip you down!"

Just then the office door slid noiselessly open, and all activity was automatically suspended as an amazing girl entered. The golden-haired beauty who crossed the room was a lithe-limbed, clean-striding American girl—a bit wilful, perhaps, to judge from her firm chin and high-tempered arch of nostril.

Her simple presence in that office brought an elusive suggestion of faraway places and unfamiliar, romantic things—a breath of the thin, dry wind that combs the deserts of Mars, a faint memory of the spicy scents that throng Venus' eternal mists.

FOR this was Gerry Carlyle, most famous Earth-woman in the System, admired and beloved by millions for her exploits along the spaceways.

Admittedly she was the greatest of all that hardy band who roam the distant worlds risking their lives in the toughest game of all—capturing and bringing back alive the weird and monstrous creatures that crawl their lethal way over the inhospitable surface of the planets and their satellites, many of whose breath is poison, and whose fangs are death, yet whose captive bodies are worth thousands of dollars to the intrepid hunter who can sell them, alive and kicking, to one of the great zoos of the world.

This slim girl, so charming, so feminine, was unquestionably tops in the most dangerous profession that men can choose.

She dominated the room at once, compellingly.

"Tommy!" she snapped. "That'll be enough! This is the New York office of the London Interplanetary Zoo, and was not designed for brawling. Now what's it all about?"

Strike pointed at the visitor.

"This crazy inventor crashed in here with his box full of junk, acting mysterious about it and refusing to tell me what it's for. Then all of a sudden he turned the darned thing on me and my legs went out from under me—"

"Oh, my. My, no. Not a crazy inventor. I am Professor Lunde, head of the department of physics at Plymouth University."

"Oh!" There was a wealth of intolerant scorn in Strike's voice, and he glanced significantly at Gerry. Lunde was well known as an overly self-important and doddering old fool many years past his prime. He had contributed nothing to advance physical research for ten years, hanging on at Plymouth by virtue of decades-old triumphs.

But, surprisingly, Gerry nodded.

"Sit down, Professor." Turning to Strike, she explained, "Professor Lunde has been sending me a letter each day for the past week, cryptically reminding me that Rod Shipkey's broadcast tonight would be of interest to me. Very intriguing."

Lunde's cheeks became shiny red apples. "Er—I must apologize for the melodramatic manner in which your attention was solicited. My assistant's idea, really. Trevelyan is invaluable. Ambitious lad. He felt a woman in your position could not be reached under ordinary circumstances. But my daughter-in-law works for Mr. Shipkey, and, well, we got wind of tonight's broadcast. I'd rather not explain the purpose of my visit until after you've heard Mr. Shipkey, if you please. He's on now."

Strike moved across the room to the television set, careful to keep out of range of Lunde's funny box. He snapped the switch just in time to catch the program highlight.

THE image of Rod Shipkey faded in quickly. Shipkey was speaking with the easy smoothness that charac-

terized this veteran explorer and newsman's delivery.

". . . and now for our five-star believe-this-if-you-can of space. Around the largest of our planets, Jupiter, a whole host of satellites of varying sizes are slung in their orbits, tied by the invisible cord of gravity. The closest of these—paradoxically known as Satellite Five because it wasn't discovered until after some of the larger ones—is a tiny bit of rock less than two hundred miles in diameter. It circles its primary some 112,600 miles away, hurtling like a cannon-ball around Jupiter in less than twelve hours. Incredible to think there might be anything on that barren and useless ball of stone dangerous or even interesting to Man, lord of the Universe.

"And yet—believe this if you can!—on Satellite Five there is a strange form of life which has defied all efforts to kill or catalogue it. No man has ever set foot on Satellite Five and returned alive!

"There are three authenticated records of space-masters who, either by choice or force of circumstance, landed their craft on Five. None has ever been heard from again. One of these cases was an expedition especially equipped to take care of itself under any conditions. It was the space ship and crew of Jan Ebers, famous Dutch hunter of extra-terrestrial life-forms, one of the earliest pioneers in that romantic and dangerous business now epitomized by the greatest of them all — our own Gerry Carlyle.

"What this strange creature, so inimical, may be, we can only conjecture, aided by fragmentary notes of spacemen who passed briefly in proximity to Satellite Five, and by telescopic observations from Io, the next Jovian satellite outward. These give us a curious picture. Four things we can say about it. The thing is somewhat saurian or wormlike in appearance, low on the evolutionary scale. It seems to be of a sluggish nature, which would be natural considering what a limited supply of energy-building food elements there must be on Five. Not more than one has ever been seen at a given time. And—believe this if you can!—the monster breathes fire! Literally!"

Gerry and Strike exchanged tolerant smiles. They had seen a lot of incredible things, but a fire-breathing monster would require a good deal of seeing to believe.

" . have precedent for this phenomena," Shipkey was saying, "in classic mythology. Cacus, from Vergil's Aneid, spouted fire. ." Here an attendant stepped into view with an artist's conception of Cacus, the half-man, half-beast slain by Hercules.

"Well, tuner-inners, time's a-flyin'. Which is just as well, for there's not much more we can say about our mysterious fire-demon, the Cacus. Safe it is to say that Man, with his insatiable curiosity, will not long let this remain a mystery. Someone with courage and facilities will dare death once again and tear out the black heart of the secret that shrouds Satellite Five. Indeed, it's a surprise to me that the inimitable Carlyle has not already done so. Can it possibly be that at last there's something in the Universe that blond daredevil hesitates to tackle? Believe *that*, ladies and gentlemen, if you can!"

The too-handsome announcer with his too-suave voice slipped deftly into focus, saying dulcetly, "This is WZQZ, bringing you Rod Shipkey with the compliments of Tootsie-Tonic, that gentle—" The screen went dead.

STRIKE looked across at Gerry in surprise.

"I bought one of those gadgets yesterday that automatically turns off the radio when the commercials begin," she explained. "All right, Professor Lunde. We've played ball with you. We've granted you an interview, listened to Shipkey. Now let's have a look at a brass tack or two."

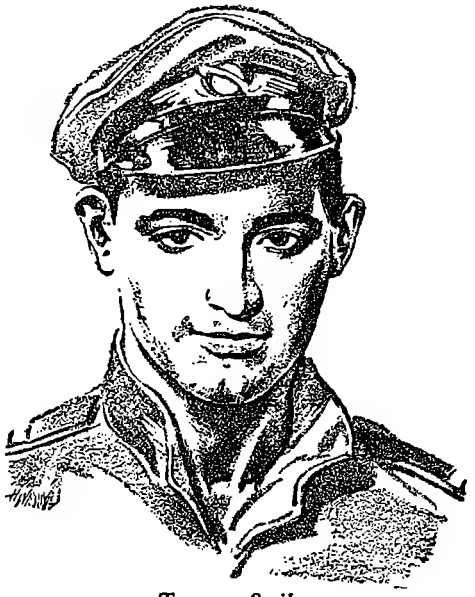
Lunde hitched himself forward earnestly.

"I have invented a weapon, Miss Carlyle, that will render the monster on Satellite Five helpless!" he proclaimed dramatically. "A paralysis ray!"

Gerry was dubious. She had seen abortive attempts at paralysis rays before.

"What's the principle?" she asked.

Lunde removed his glasses and used



Tommy Strike

them to tap his fingers and gesture with as he broke into a classroom lecture.

"The transmission of a nerve impulse along the nerve fiber is provided by local electrical currents within the fiber itself. But the transmission of a state of activity from one nerve fiber to another, as happens in the brain when sense organs are stimulated, or from a nerve fiber to a muscle fiber, as happens in voluntary movement, means transmission of excitation from one cell to another.

"Passage over the junction point between cells is effected by a chemical transmitter, acetylcholine. Every voluntary or involuntary movement is accompanied by the production of minute amounts of acetylcholine at the ends of nerve fibers, and it is through this chemical agent that the muscle is set into action."

Tommy Strike stirred.

"Old stuff, Doc. Sir Henry Dale and Professor Otto Loewi won the Nobel Prize for physiology and medicine for that discovery sixty — seventy years ago. Nineteen-thirty-six, wasn't it?"

Lunde seemed vaguely annoyed by this display of erudition.

"Well!" Professor Lunde was resuming. "The acetylcholine is very unstable, and breaks down into other chemicals as soon as its function is completed. There is a disease known as myasthenia gravis, characterized by muscle weakness, in which there is too-rapid destruction of acetylcholine. Now, if a device could be built which would decompose acetylcholine as fast as it is produced within the body—you see? The muscles would be unable to receive nerve impulses, unable to act. Paralysis!"

Lunde now exposed the interior of the leaden-colored box which had caused Strike such distress earlier. The interior showed a bewildering array of tubes and coils, all in miniature; there was also a portable power unit attached. The lens was shutterlike, similar to a camera lens. It appeared extremely simple to operate.

"This, in effect," went on Professor Lunde in lecture style, "produces a neutron stream. We decided against a stream of electrons, because they lack sufficient momentum; protons, too, can be deflected. But neutrons react with atoms at low energies. And the penetrating neutron blast destroys the acetylcholine by adding to its atomic structure, thus making it so extremely unstable that it breaks itself up at once. It does not harm blood or lymph or bodily tissues because they are essentially stable combinations, whereas acetylcholine is not."

"Say! That makes sense! And I can testify the blasted outfit sure works! That means we can take a crack at this Cacus jigger on Satellite Five and show Shipkey up for a dope! How about it, Gerry? Let's go!"

GERRY shook her head.

"Impossible, Tommy, and you know it. I have lecture commitments three weeks ahead, conferences with Kent on the autobiography, business appointments, a hundred and one things to do. No, the Jupiter trip'll have to wait. Sorry, Tommy. . ." Then Gerry's voice turned poisonously sweet. "Besides, I have to run up to Hollywood on the Moon day after tomorrow. Special occasion at the Silver Spacesuit. Henri, the *maitre d'hotel*, is naming a sandwich after me. A double-decker: hard-boiled egg and ham!"

"Yow!" Strike convulsed with de-

light, with one wary eye on Gerry as if half expecting a missile. "That's good. Y' know whose idea that is?"

"Certainly. Nine Planets Pictures runs the Moon as they please, and this is that chimpanzee Von Zorn's idea of humor. He put Henri up to it. But boy—will I make a speech that'll singe his ears!"

But Tommy wasn't to be put off by changing the subject; he was like a small boy at prospect of a fishing trip. "All right; you can't go. But nobody wants to take my picture or get my autograph. I'm not tied down here. Besides, I'm sick of sitting around. There isn't a reason in the world why I couldn't round up the crew and take the *Ark* myself!"

"I remember the last time you started out alone! On Venus—"

Tommy Strike brushed this aside.

"That was different. This'll be a cinch with the *Ark's* equipment and Lunde's ray and all the gang—"

"Well—" Gerry was weakening. "Might be arranged. Before we decide on anything definitely, though, there're three things I'd like to ask Professor Lunde."

"Yes, Miss Carlyle?"

"First, have you tried your ray on extra-terrestrial animals?"

"Oh, yes, indeed. The curator of the local zoo permitted experiments on several Martian and Venusian specimens. All creatures of our Universe, it seems, transmit nerve impulses with the aid of acetylcholine. Provided this—this Cacus is not a vegetable, I'm sure the ray will work on him, too."

"All right. Secondly, what's in this for you? Not money. Even if we found the ray practicable, you couldn't manufacture it for general distribution because your only market would be hunters like myself who wish to capture live specimens."

Lunde put on a vague dignity.

"Prestige, miss, is my sole motive. Prestige for Plymouth University and its faculty."

"I see. And now tell me who put you up to this?"

"I beg your pardon?"

"I mean whose idea was it to write me notes about the Shipkey broadcast and so on? You're not the type with nerve like that."

Gerry Carlyle

"Er—no. Not entirely my idea. Trevelyan's, really. He's my assistant, or did I tell you that before? Smart lad—"

"Very well, Professor Lunde." Gerry cut the interview off abruptly. "You've been very entertaining. My secretary'll give you a written authorization to install your apparatus in the *Ark*. We may be able to give it a trial."

As soon as Lunde had left Gerry immediately snapped open a circuit on the inter-office communicator.

"Barney Galt? You and your partner come right in."

TWO men promptly entered through another door. Galt was tall and lean with a face like a good-natured chow dog. His partner was a nondescript man of middle age. Both were old-time policemen, retired from public duty to act as private investigators for Gerry Carlyle. She wasn't a girl to bother with bodyguards, but a woman in her position is besieged with all sorts of threats and rackets and fraudulent charities and fantastic schemes; Galt invariably discovered the good among the bad.

"Fellow named Lunde just left here, a little gray-haired chap with a bundle under his arm. Follow him, make a complete check. Don't interfere with anything he may do; just report anything phony."

The two detectives saluted casually and left on their unobtrusive mission. Strike snorted.

"Why set those bloodhounds on Lunde's tail? He's all right. A bit of an old fool who has stumbled on something good, but too dumb to be anything but honest."

"Just routine, Tommy. I don't think there's anything wrong with Lunde. Just a hunch, or something. If he gets a clean bill of health, you can take the *Ark* and go."

"Woman's intuition again?" Strike spoke with tolerant condescension.

"So what if it is? Tommy, I take lots more precautions than this when I sign the lowliest member of my crew for a dangerous expedition. No doubt Lunde is all he appears, and I know you can take care of yourself, but you can't blame me for wanting to make sure when it concerns the man I love."

They grinned at each other like a couple of love-sick kids.

"Okay, fluff. Snoop around while I rout the crew out of their sinful pleasures and provision the ship. That'll take several hours; you'll know by then everything's on the up and up. Call me as soon as Galt okays Lunde, because Jupiter's nearing conjunction and I want to take off as soon as possible. 'Bye."

CHAPTER II

Flight of the Ark

EVENTS marched swiftly on their silent feet, moving inevitably into place in the strange pattern that spelled disaster. Tommy Strike was busy over radio and telephone, giving forth the rallying cry that brought the seasoned veterans of the *Ark* rushing from all corners of the state, dropping unfinished business or pleasures at once to get to the space port in time to go on another adventurous journey. They'd tell you, those tough space-hounds, that Gerry Carlyle's expeditions were nothing but iron discipline and hardships and sudden death waiting to pounce on the unwary; but you couldn't bribe one of them with love or money to give up his berth on that famous ship.

At the landing field itself, under the blazing carbon dioxide lamps, a small man drove up in a surface car, showed an authorization to the guard, passed into the burglar-proof enclosure. He carried a bundle to the *Ark*, again showed his pass, and went inside. He came out before long empty-handed.

Gerry Carlyle worked without cessation in her office, while outside the city's lights went out one by one, and the muted torrents of traffic in the canyons of the city street grew thinner and thinner, dwindling away to trickles. Presently a light flashed above the door to the outer office. Someone wanted admittance. Gerry slid a heat-ray pistol into plain sight, then tripped the foot-switch which unlocked the door.

"Come in!" she cried.

It was Barney Galt. One hand bulged suggestively in his coat pocket. Before him, registering bewildered indignation, walked a short, stocky chap of about thirty, with bold, dark eyes. He strode aggressively up to Gerry.

"I demand to know the meaning of this outrage!" he said. "Your—your hireling here has held me up at the point of a gun, without authority, and forced me to come to this office against my will. That's abduction, and I'll see this gangster go to the disintegrator chamber for it!"

Gerry looked questioningly at Galt, who grinned faintly.

"My buddy's still on Lunde's tail. We split when we seen this monkey come out o' the prof's place. He's the assistant, Trevelyan, an' he looks an awful lot like a bird we picked up ten-fifteen years ago for delinquency." Galt was famous for his camera-eye. "Anyhow, he took the stuff to the *Ark* and installed it. Left instructions how to work it, then beat it. I had the space-port guards hang onto 'im while I

sniffed around. Miss Carlyle, the junk he put into the *Ark* wouldn't paralyze a beetle! It's fake! I tried it!"

Trevelyan sneered.

"You just couldn't puzzle out how to work it, that's all. I demonstrated it to a couple of the crew there. They'll tell you it was left in perfect shape. I demand—"

"Shut up, you." Gerry's voice was like a mallet. The paralysis ray had been extremely simple to operate; Galt could have managed it easily. Gerry remembered her vague suspicions at Lunde's carefully arranged build-up, how he insisted on a certain order of events, Shipkey's broadcast first, *then* his apparatus, all designed to whet her interest.

It had all seemed rehearsed, a routine entirely foreign to Lunde's vacillating character. And there had been the misty figure of the assistant in the background, "clever" and "ambitious." Trevelyan, the motivating force behind the innocuous Professor Lunde. There was something off-color here.

"Then you wouldn't mind if we went back, picked up Lunde, and tried the apparatus again?"

TREVELYAN shifted uneasily.

"Why not? Of course, the assembly is delicate, and the ray machine can easily be jarred out of kilter."

"So that's what you did! After the test, you knocked one of the parts haywire so your superior would be blamed for sending men out to risk their lives with apparatus so delicately and unsubstantially built that it won't even last through an ordinary testing. Why?"

"You're crazy, lady! *I* didn't do anything! I just installed the stuff Lunde told me to install. If it's broken down already, that's not my fault!" He suddenly twisted free of Galt's grip. "I insist you allow me to go, or else suffer the consequences before the law!"

Silence, then, while Gerry pondered. Finally she looked at Galt.

"Well, Barney, what does your detective instinct dictate?"

Galt laughed shortly.

"Police methods ain't changed much in fifty years, Miss Carlyle. When we used t' want t' find out things in a hurry, we persuaded people t' tell us."

"You mean scopolamine—the truth serum?"

"No, ma'am. That ain't always reliable. We used to use a rubber hose 'cause it didn't leave no marks. Science has give us gadgets like the psycho-probe that beat the old hose all hollow. They don't leave no marks, either, but they sure get the truth out of a man."

Trevelyan's eyes held a horrified look of dawning comprehension.

"You can't third-degree me!" he shouted. "It's unlawful! I want—"

Galt clapped his powerful fingers across the man's mouth.

"Okay by you, Miss Carlyle?"

Gerry nodded. She was a girl who had lived with blood and death and wasn't the one to quail before a little necessary brutality. When there might be lives at stake, she could be as hard as any man.

"Shoot the works, Barney. We'll use the back office. The walls are Vacuum-Brik with mineral fluff insulation, so we won't disturb anyone. And don't worry about the law. If anything happens, all the influence of the L.I.Z. will back you up."

Galt grinned ominously at the trembling Trevelyan.

"My buddy'll have a hemorrhage when he finds out what he missed!" And they grimly forced Trevelyan into the tiny inner room, locked the door behind.

It was mid-morning when those three staggered out of that little black chamber. Galt and Gerry Carlyle were drawn and haggard, red-eyed from lack of sleep, grim-faced from the things they had had to do to break Trevelyan down. Trevelyan himself could scarcely stand. There was not a mark on his body; physically he was unharmed. Trevelyan had been a tough nut to crack, but Galt had done it. They had the story. The end had justified the means.

It wasn't a pleasant tale to hear—a recounting of ugly passion, jealousy, treachery, hate. Under the American university system, for fifty years increasingly the centers of ultra-conservatism and reactionary tendencies, Trevelyan, in common with many un-

derlings, had had no chance to express his own theories or receive credit for his own calculations and inventions. The silly and unjust ruling that required all papers to be published—and all discoveries to be announced—by the department heads only, regardless of who in the department might have been responsible, had stifled Trevelyan's restless soul too long. He couldn't stand by and see fools like Lunde take credit for scientific advances with which they had nothing to do. It galled him.

SO he had planned to discredit Lunde completely, have him ousted, and take what he felt was his rightful place as professor of physics at Plymouth University. If someone as famous as Gerry Carlyle tried out a Lunde "invention" and found it a failure, with probable loss of life, public indignation would ruin him. Then Trevelyan, turning up with the genuine paralysis ray and a story of Lunde's blind stupidity and the fact that he had refused to take advice from subordinates, would ride into office easily. So he had egged the professor, with plenty of soft soap about the glory of Plymouth U., into saddling Gerry Carlyle with the paralysis ray.

The only thing Trevelyan didn't foresee was meeting an old-time copper like Barney Galt, who wouldn't hesitate to go any length to wrest the truth from a man he suspected. That was where Trevelyan had slipped.

Gerry picked up a visiphone and called the space-port.

"Put Mr. Strike on, please," she asked the attendant who appeared on the screen.

"Mr. Strike, miss? I'm sorry. He left with the *Ark* for Jupiter at eight o'clock this morning."

"For Jupiter!" she screamed. "That's impossible. He promised to wait until I okayed everything!"

"Well, miss, Mr. Strike and the crew were all ready to leave several hours ago. He became impatient and tried to get in touch you two or three times. Finally I heard him say everything must be all right and you'd gone home to bed, and anyhow he wasn't going to wait while some—er—"

"I know. 'Some dame in pants!' Go on from there."

"Uh—exactly, miss. While some dame in pants stalled around thinking up excuses to spoil the trip. And off he went." The attendant's face twisted slightly but remained heroically stolid.

"All right. Don't stand there like a dummy!" Gerry snapped. "Plug me into the radio communications bureau!" Once the connection was made, she told the operator to get in touch with the *Ark* at once. Minutes passed. At intervals the operator cut in to say,

"Sorry, Miss Carlyle. The *Ark* does not answer. We'll keep trying."

After ten minutes of this, Gerry suggested they call some other ship nearby and have her contact the *Ark*.

"We've already done so, Miss Carlyle. The Martian freighter *Phobos* is in the same sector as the *Ark*. The *Phobos'* signals are not answered, either."

Gerry hung up abruptly as comprehension dawned on her.

"That louse Trevelyan!" she cried aloud, wishing momentarily Galt hadn't taken the fellow away so she'd have something more satisfying than the desk to pound. "He wrecked the radio receiver, too. If Tommy tests the ray apparatus before reaching Jupiter, that reckless guy will be so far along on the trip that he won't want to come back."

Quickly Gerry got busy on the phone, calling the major space-ports of the Earth, asking the same question over and over:

"When does your next ship leave for the vicinity of Jupiter?"

Luck was against her. Every passenger clipper in service was either out along the spaceways or undergoing repairs. Frantically, then, Gerry got in touch with those private concerns that had ships comparable in speed and power to the *Ark*. There were only a few—one or two utility companies, the big exploitation concerns. Again she failed. Sudden fear loosed ice in her veins. The fact had to be faced: nowhere on Earth was there a ship available to overtake Tommy.

Gerry wasted no tears over spilt

milk. She did the next best thing, buying passage at a fabulous price on a fast freighter leaving for Ganymede within the hour. She barely had time to see Lunde and explain what had happened, bully him into parting with the only remaining model of the paralysis ray—a miniature low-power set for small-scale experimentation — rush to the port in an air-taxi and dash through the freighter's air-lock ten seconds before deadline.

Only when she was safely ensconced in one of the foul-smelling holes these freight lines used for cabins was Gerry able to relax and give vent to a whole-hearted, old-fashioned, mule-skinner cussing of everyone and everything connected with this ghastly game.

CHAPTER III

Outpost of Forgotten Men

ON Ganymede, fourth satellite outward from Jupiter, is the strangest little community in the System. It is the center, in a way, of the vast mining activities that go on throughout practically every Jovian satellite, except Five, large and small.

It would be impracticable for the freighters which periodically bring supplies and take away the accumulated ores and concentrates to make the rounds of each individual satellite, scattered about Jupiter in different positions as they are. So a single base was established on Ganymede. Earth freighters stop only there to leave supplies and equipment; and all shipments are brought to the Ganymede depot by a local transport system.

It is the pilots of these local transport ships that compose this unique little village. Not ordinary pilots, these men, but the toughest, most hard-bitten crew of rocket-busters that ever spat into the teeth of Death herself. Gutter scrapings, many of them, society's outcasts—men with ugly blots on their records such as drunkenness on duty that cost the lives of passengers—criminals, murderers.

There is a reason for this: the job these hardy men undertake requires that they take their lives in their hands every time they leave the rocky soil of Ganymede. The terrible iron fingers of Jupiter's gravity threaten every instant to drag their puny ships down, down, to plummet into the heart of that pseudo-sun. Great magnetic storms tower high above the limits of Jovian atmosphere, the slightest breath of which would ruin the firing system of a rocket ship and leave it to spin disabled to destruction. Unrelaxing vigilance and incredible reserves of fuel—the one god of these godless men—is the price of survival.

Wages are high here, but none but those who have little to live for consider the job. The law shuts its eye to criminals who take refuge there, because they are doing valuable work. Besides, just as surely as if they had been sentenced in a tribunal of law, they are men condemned.

Yet this lonely little outpost with its heavy-fisted, bragging, hard-drinking ruffians was Gerry Carlyle's only hope of reaching Strike in time to help him. When, after several restless days and sleepless nights during which the so-called "fast freight" seemed to crawl among the stars, it finally reached Ganymede, Gerry was first out of the ship. The place was unprepossessing, simply a barren landing field pitted and scarred from rocket blasts. The thin air was bitterly cold, and ugly yellow Jupiter-glow lighted the scene badly.

While the crew unloaded the cargo, Gerry turned to a young under-officer.

"Looks like this place was wiped out by the plague. Where is everyone?"

The officer smiled.

"Pretty self-important bunch, these bums. Act as if they were lords of creation and us ordinary mortals are only born to cater to their vanity. Here come a few of them now."

There was a cluster of three or four barracks in the near distance. Out of the most pretentious of them, a half dozen men sauntered casually. They were hard-faced, dressed in furs. The

Save several cents a pack! Try Avalon Cigarettes! Cellophane wrap. Union made.

officer met them halfway.

"Got a passenger for you this time. Wants to see your chief."

One of the pilots, a huge hulk of a fellow, grinned.

"You don't say! We ain't got any chief. We're all equals here; everybody's just as good as everybody else."

THE freighter officer bit his lip indecisively, but before he could speak, Gerry's temper slipped its leash a trifle.

"Nonsense!" she cried sharply. "A blind man could see that you and this bunch of down-at-heel underlings aren't equal to anything. You must have a leader, someone to tell you what to do. Without a chief you wouldn't know enough to come in out of a meteor shower!"

There was dumfounded silence as the pilots all gathered close for a good view of this phenomenon.

"Well, split my rocket-tubes if it ain't a dame!" the big fellow exploded.

"I'm Gerry Carlyle," the girl announced imperiously, "and I'm in a very great hurry. I insist upon seeing your chief at once!"

The giant opened his mouth to bellow in Gerry's face, but something changed his mind at the last instant. He shut his mouth, scratched his chin in bewilderment.

"Maybe we better let Frenchy figure this one out," one of the others suggested.

There was general assent, and the party moved across the field to the men's living quarters. A blast of warm air struck their faces as the door opened, and everyone shucked off his furs. There were four more men inside and one of them, with black spade beard and dark, flashing eyes, was obviously a Frenchman.

"Hey, Frenchy, there was a passenger landed today, the big man said.

The Frenchman was busy with something in his hands and did not look up.

"So, my good Bullwer? And this passenger, what is it that he wishes?" His grammar, syntax, and accent were definitely French.

"Wants to see our chief. Ain't that a laugh?" Bullwer looked around and saw it was no laugh. It was obvious everyone in that room accepted the mild-looking little Frenchman as nominal leader.

The latter looked up, handling Bullwer with his eyes.

"So you bring this passenger to see Louis Duval, is it not?"

Bullwer squirmed.

"Okay. No need to get sore. The passenger's here, but it's just a dame."

Duval looked around, startled, saw Gerry. For a moment of breathless silence he stared as if it had been given to him to see a vision. Then he sprang to his feet.

"A dame, yes!" he breathed. "But a dame of the most magnificent, is it not? Louis Duval, mademoiselle, at your service!" And he bowed low over Gerry's hand in the fashion that only a Frenchman can bow to a beautiful woman.

Suddenly Duval glared about him.

"Swine!" he roared. "Take off your hats! A chair for the lady! Refreshments! *Vite! Vite!*"

But Gerry was not to be swerved from her purpose. She stepped close to the Frenchman, turning loose the full battery of her eyes.

"Monsieur Duval," she said tensely, "I'm here for a reason. Every minute that passes may mean the difference between life and death to many men. I must, at the earliest possible moment, get to Satellite Five. The only men in the System with the courage and skill to get me there in time are right in this room. Will you aid me?"

The pilots, who had lounged about in interested silence while Duval held the floor, now burst into concerted, ironic laughter.

"The dame don't want much," one said. "Just a mass suicide!"

"Satellite Five!" ejaculated a second. "There ain't two dozen ships in the System could make Five. And they ain't none of 'em anywheres near this dump of a Ganymede!"

DUVAL'S eyes darkened with genuine regret.

"Mademoiselle," he declared ear-

nestly, "there is nothing on this world or any world we would not do for you gladly—if it can be done. But the journey to Satellite Five—it is not possible."

He took Gerry gently by the arm, led her to a window.

"Look. There is one of the vehicles so splendid in which we make our trips regular to the other satellites."

Gerry stared. The ship was an ancient iron hull. Its rocket exhausts were badly corroded; the plates were warped and buckled, roughened by the relentless pelting of thousands of wandering meteorites. A far cry from the *Ark's* streamlined power which would take it anywhere in the System.

"That wreck!" Gerry ejaculated. "Why, that's a condemned crate if I ever saw one! That thing wouldn't last thirty minutes in space! It'd fall apart!"

"Frequently they do fall apart, Mademoiselle. For example, Scoffino is two days overdue from Io. Soon we will drink the toast."

Gerry's eyes followed Duval's to a shelf which ran across the rear of the room. On it were ranged a row of shattered goblets; etched in acid across each was a name.

"Great heavens!" Gerry was indignant. "That's criminal!"

"But no one can blame the company. They would be very foolish to risk ships valuable, costing many thousands of dollars, on these routes hazardous. Besides, there is genius—I, Duval, admit it—among the mechanics. They continue to patch and to patch and somehow most of us we manage to return alive with our cargoes. But to journey to Five—" Duval hunched his shoulders in the inimitable shrug with which a Frenchman can express so little or so much.

Something rose suddenly in Gerry's throat, chokingly. Was it to be failure this time? And what about Tommy Strike, facing some alien horror with empty weapons? He was so quixotically reckless that he would never consent to turn tail and flee, even when his own life was in danger. Was he, too, to die with succor so near at hand because Gerry Carlyle couldn't dig up transportation to bridge a little gap of a few hundred thousand miles of space?

Not while the strongest in Gerry's arsenal of weapons was yet unused. She had a hypodermic tongue, and the knack of injecting caustic, rankling remarks. She whirled on the group of lounging pilots, fire in her eye.

"That's a laugh!" she cried in piercing tones. "That's a real laugh! My fiancé is down there on Satellite Five right now, fighting it out with some monstrous thing no man has ever seen to tell of. There's nothing the matter with *his* insides; he's got what it takes. But because of a scheming rat back in New York, he's out there defenseless with a weapon that won't work. I have the real one, and I came to the only place in the entire System where I could find men supposedly with the skill and guts to pilot me to Satellite Five.

"And what do I find? A bunch of no-good tramps, half-baked defeatists playing cribbage for matches! Telling each other what tough guys they really are, living perpetually in the shadow of death! Dramatizing themselves! Breaking a two-bit goblet every time one of their worthless carcasses takes a dive into Jupiter—the cheapest kind of theatrics! If the whole lot of you were laid end to end, it would be a darned good job! All told, you couldn't muster up the courage of a sick rabbit!"

IT was a cruel, bitter indictment, completely unjust; but it was the last trump in Gerry's hand. If it failed to take the trick, she was through. With a final sweeping glance of unutterable scorn, she strode out of the barracks and slammed the door behind her.

There was thick silence in the pilots' quarters after the girl left, broken finally by sheepish stirrings and a muttered, "Whew!"

Of all the men gathered there, Gerry's denunciation affected Duval most poignantly. He was French, and had always had all the Frenchman's traditional romanticism and chivalry and love of beauty. For three seemingly

endless years he had been a lonely exile on Ganymede, far from the beloved Gascony of his birth.

Paris was a dim memory; he had not seen a single woman in years.

All the ideals in his romantic soul had become magnified to an unnatural extent. Despite the fact that he dominated this hardy crew, he was a misfit. By nature he was cut out to be a reincarnation of the chevalier Bayard, *sans peur et sans reproche;* cruel circumstance had made him—what he was. And now this flame of a girl had poured salt on his wounds. Boy and girl in love, and in need. It meant everything such a situation means to any Frenchman, a hundred times keener. And he with opportunity to make his worthless life meaningful again.

Purposefully Duval strode to a cupboard, yanked out a handful of charts, pored over them. He sat down with pencil and calculator, muttering to himself, figuring.

"Name of a pipe," he whispered presently. "It might be done."

Duval hurried out after Gerry and found her by the freighter, which was now taking on its load of ore concentrates, trying bitterly and hopelessly to argue its commander into attempting to make Satellite Five.

"Mademoiselle!" called Duval breathlessly. "Mademoiselle, I believe there is a possibility of the faintest—"

"Duval!" Gerry cried, her face lighting like a torch from within. "You mean you'll try it? Oh, that's marvelous! You're perfectly grand! And I'll see you're properly rewarded, too. I have influence. Plenty. I don't know what you did back home, but if it can be fixed—"

Duval brushed this aside.

"We have perhaps one chance in the hundred to arrive safely. After that is time to talk of the rewarding. Fortunately, the Satellite Five is almost directly opposite Ganymede, on the other side of Jupiter—"

They were moving rapidly across the field tarmac toward the battered rocket ship in its starting cradle, Duval's feet fairly twinkling to match Gerry's eager strides. The paralysis ray swung at her side. She nodded incisively.

"I see what you mean. We dive straight into the heart of Jupiter to gather terrific momentum, then cut over in a hump and utilize our speed to draw clear and make our objective. Splendid! I knew there must be some rocket-buster around here with the stuff to make this trip."

Duval beamed.

"You are willing to risk the life with me?"

"Perfectly."

Drawn by curiosity, some of the pilots drifted around as Duval made a swift final check-up before taking off. A few, a bit embarrassed by anything like a display of emotion, diffidently shook the Frenchman's hand in a manner clearly indicating they never expected to see him again. Just before they sealed the entrance porte, Bullwer poked his head inside.

"Say! You really gonna shoot for V, Frenchy?" he asked incredulously.

Duval drew himself up to every inch of his five feet. "And why not? If there is anyone who it can achieve, I, Duval, am he, is it not?"

Bullwer grinned.

"Maybe so. But I'll lay a week's pay you can't."

"Done!" And Duval slammed the porte shut, nearly decapitating Bullwer. Flames spewed from the rocket-tubes in tenuous streamers along the ground; thunder shook the ship. Scarcely waiting for the motors to warm up properly, Duval poured on the power, and the strangely assorted couple took off on perhaps the most hazardous journey in the history of rocketry.

CHAPTER IV

Re-birth

GERRY always remembered that trip with the breathless terror of a nightmare. Once in the ship, there was no time to adjust herself to the danger, none of the usual hours of preparation, of preliminary approach, during which one can screw up courage to the sticking point. Instead, one in-

stant the clang of the porte was ringing in her ears, the next, the booming of the engines, and all at once they were dropping like a plummet straight into the maw of the gigantic golden bubble of Jupiter, which burgeoned before them like a mighty blossom of disaster.

Duval was a grim little figure strapped in the pilot's seat, his magic hands flying over the control board, delicately probing, guiding the old cracker-box ship miraculously, wary of indications of Jovian magnetic storms which would mean destruction for them. Completely ignoring the physical effects of acceleration, Duval soon had the rocket ship hurtling down at speeds she had never achieved before, and for which she was never built.

Soon the sinister, swirling globe of Jupiter filled every corner of the visi-screen. Duval spoke sharply without turning his head.

"The straps, mademoiselle! Make certain they are tight! Soon we must make our move!

Gerry set her teeth grimly, watching with almost impersonal admiration the skill of Duval. Too late to turn back now; already a faint scream was audible as they bulleted through the extreme upper reaches of the Jovian atmosphere. Then Duval's fingers plunged downward on the firing keys, and the under-rockets flowered crimson petals of flame.

The ship lurched, groaned hideously in every joint as if in some strange cosmic labor, striving to tear itself free. Instantly the steely fingers of Jupiter's gravity wrenched powerfully at the ancient hull. Seams squealed, ripping open as the rivets sprung; the plates twisted torturously under the unprecedented strains. Air pressure dropped as the precious mixture whistled out through a dozen tiny vents. The obsolete air-o-stat pumped valiantly in a grim losing battle.

Temperature suddenly rose, rapidly becoming intolerable as the outer air became thicker and friction heated the hull. Sweat poured into Gerry's eyes, but she maintained her stoic calm. The picture of Jupiter on the visi-screen was shifting erratically; a matter of a few seconds would tell the story. . .

They made it. Their incredible velocity defeated the greedy powers of Jovian gravity. One final burst in which the rocket-tube flames burst completely around the ship's nose, obscuring everything, and they had cleared the "hump," missed the surface of Jupiter cleanly and burst through the layers of upper atmosphere into open space again. Ahead, moving round to its assignation with the ship, was Satellite Five, barren and bright in the Jupiter-glow.

The rest was comparatively simple. Jupiter's gravity still had a strong claim on them; it was as if they were chained to the giant planet by a cosmic rubber band, which tightened inexorably the further they coasted away. Handling this mighty force with dexterity, Duval jockeyed the ship so it was barely moving when it reached the appointed spot in space. They came to rest with a jar that completed the wrecking of the ship, but they were safe.

Gerry took Duval's hand man-fashion and squeezed hard.

"You were magnificent, Duval; I'll never forget it. But now we've got work to do. Ready?"

THEY piled into space-suits, Gerry seized the paralysis equipment, and the two left the wreckage. There was nothing moving in sight on the fairly level plane, spauled off by Jupiter's fierce heat when the System was young, whose horizon was a scant mile away. So they started walking. Gravitation was surprisingly strong, indicating unusual density. This fact, plus the intense cold which slows down the dance of the atoms, accounted for the fact that Five still retained remnants of an atmosphere.

The hikers even saw traces of water vapor, in form of frost. Occasionally they passed clumps of mossy or lichenous growth. Twice they observed colonies of sluglike creatures growing, reproducing, and dying with amazing rapidity. And then, like an enormous silver cigar looming over the horizon, the *Ark* came into view. It looked almost as large as the satellite itself, and

there was furious activity going on. A half-dozen suited figures scurried about the nose of the *Ark*. From the pilot house another figure was throwing out instruments to those below.

Gerry and Duval drew quickly near, and the girl shouted into her head-set, "Hey, Tommy! Tommy Strike!"

All the moving figures turned sharply, in varying attitudes of astonishment. Then one of them gestured sharply and came lumbering over the plain as fast as possible.

As the two from Ganymede moved forward, Duval tripped and sprawled ludicrously, though harmlessly, on his face. He scrambled carefully to his feet and bent over to see what had caused his humiliation. He uttered a sharp exclamation.

"Name of a pipe! What a monster of the most incredible!"

Gerry, too, stopped to examine the thing stretched out on the rocky ground. It was something beyond even Gerry's vast experience in extra-terrestrial life. From tip to tip it might have measured as much as twenty feet, and its ugly, warty gray hide was divided into armored sections along its entire length with soft spots between the plates. It was oval-shaped in lateral cross-section, something like a gigantic cut-worm that has been stepped upon but not quite squashed. Duval was for leaving the nauseous horror strictly alone.

Gerry's clinical instinct, however, prompted her to turn it over with her foot. About a fourth of the way along the under side were six short legs, arranged with no particular symmetry, just stuck here and there. Sprouting about the front end of the thing was a forest of what looked like dead gloved fingers—sensory organs of some kind. The mouth parts resembled a funnel, much like the proboscis of the common house-fly. Two eyes set on either side of the head were glazed in death. While the entire lower half of the abdomen was slit wide open; inside was nothing but a sickening mess of half-devoured vitals.

At that moment Tommy Strike finally galloped up, spluttering.

"Gerry! How the dickens did you ever manage to get here? And why? And—"

"Never mind all that!" interrupted Gerry. "Duval here brought me from Ganymede by rocket. He's the greatest pilot in the System. And I came because the paralysis ray equipment you have is no good."

"No kidding!" Strike was bitterly sarcastic. "You came a long ways just to tell us that. We found it out a few hours ago. It cost us two lives. Leeds and Machen are gone, burnt to cinders."

"Burned!" Gerry rocked back on her heels, stunned at the loss. "Then this —this Cacus really does breathe fire?"

"And how it does! You've never seen anything like it. But what I want to know is about the ray apparatus. What—"

GERRY quickly explained about Trevelyan's treachery. "I have the genuine article with me now." She displayed Lunde's other model.

Strike seized it avidly.

"Then let me have it! Will we give that monkey what-for!"

"But wait a minute, Tommy. What about this thing here?" She kicked at the empty dead thing at their feet. "Is this the Cacus?"

"Well, it *was* the Cacus." Strike looked a bit befuddled. "Though now the Cacus has helped himself to the *Ark*. Just walked in and took over. The pilot-house and engine rooms are locked, keeping him out of there, but the boys trapped in the nose of the ship are jettisoning the valuable stuff in case the Cacus decides to burn his way in there." He swore. "It's a mess!"

Gerry shook her head.

"Then you mean there's more than one Cacus; you killed this one, but another showed up. That it?"

"No, that isn't it! There's only one Cacus. He—he—" Strike stopped and drew a deep breath. He rolled the carcass over on its side and began again. "See that heat-ray burn? Well, here's what happened. When we found the paralysis apparatus on the blink, we were practically here already, so we figured we'd take this freak with our regular equipment. We found him crawl-

ing around with little jets of fire occasionally licking out of his mouth or snout or whatever it is. He was burning this mossy junk that grows all over, and also toasting plenty of these snail-like things, and then siphoning them up. Omnivorous.

"Well, it looked like a cinch, so I creased him across the spine with a heat-ray, just enough to double him up while we doped out a muzzle to cap that fiery mouth of his. It twisted him into a knot, all right, but then the damnedest thing happened. He split down the middle like an over-ripe fruit and another Cacus popped out almost full-born. He spouted a terrific blast of fire at us, and while we ducked out of range, the new Cacus just sat down and made a meal off his mother's—or is it his father's—insides. You could see him grow by inches till he got about the size of the original. Then he made for the ship.

"Leeds and Machen were guarding the air-lock, and they gave the second Cacus full-power heat-ray. It never bothered the thing. It just burned the two of 'em to so much charcoal with a single breath and pushed on inside the ship." Strike's mouth twisted bitterly at the memory. "Most of the gang escaped, though a few are still in there, safe behind the emergency bulkheads and with some of the air still preserved. Don't think anyone else was hurt."

The trio hurried toward the *Ark*.

"So the Cacus is bi-sexual," said Gerry wonderingly. "Self-fertilizing. That's amazing. And only one of him on the whole satellite! That's really amazing."

Strike looked at her queerly.

"You don't grasp the *truly* amazing part of it—the Cacus' imperviousness to Leeds' and Machen's heat guns. Don't you see, Gerry? When Cacus number one was attacked by the heat-ray, it promptly transferred all its life and intelligence to the youngster in its womb. But it also transferred the power of unbelievable adaptability, so when Cacus number two was born it was completely defended against that heat-ray forever henceforth.

"It'd be the same for any other weapon we have for capturing an animal alive; it would simply let itself be born again fully adapted and protected. The only way we can stop this monstrosity is by suspending instantly all its vital functions, or by killing it outright."

THE girl thought for a moment.

"Well, why worry?" she said finally. "A cathode gun will always do the trick."

"That's just it," said Strike with melancholy triumph. "The door to the arsenal was open when the Cacus entered the ship. Everyone ran out of there in

[Turn Page]

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a hurry, and there isn't a cathode gun in the crowd."

Gerry snorted.

"You certainly have a genius for getting into trouble. But it can't be as bad as you say. For one thing, this business about instant adaptability is so much moon-truffle. It's fantastic. Leeds' and Machen's guns simply failed. Or maybe they shot wildly."

Strike expressed unutterable scorn. Gerry Carlyle's men were all sharpshooters, and they simply never got rattled.

"You'll soon see for yourself," was all he said.

When the three of them approached the *Ark*, the men gave a ragged cheer for their famous leader and rallied hopefully around, visibly heartened. Nothing in their experience had ever completely baffled Gerry Carlyle, except the strange case of the Venusian murri, and they had confidence she would get them out of this predicament.

Gerry looked over the familiar faces with relief—Kranz, Barrows, Michaels—most of her veterans were all right.

"Let's find out about this adaptability stuff first of all," she decided. "Anyone got a hypo rifle handy?"

The original hunting party had carried several, and presently one of the men cautiously approached the open porte of the *Ark* to act as decoy while Gerry stood within easy range, rifle ready. The decoy peered gingerly inside the ship, passed the two grim chunks of seared flesh and fabric that marked the pyres of two brave men, then finally vanished inside. Minutes dragged by. Then a faint shout rang in the watchers' helmets, and suddenly the man tore out of the *Ark* as fast as he could run.

Once outside, he gave a tremendous upward leap many feet high, and just cleared a sizzling tongue of hot flame that belched out of the door behind him.

The Cacus, bulgy-eyed and hot-breathed, crouched angrily at the door.

Quickly Gerry drove home three hypodermic bullets in the creature's soft flesh in the crevices between the armor-like coverings. They took quick effect. The Cacus' head drooped sleepily, and he moved uncertainly as if undecided whether to come out or stay in.

Then suddenly a series of hideous abdominal convulsions wracked him.

The monster rolled over, still inside the ship; as if an invisible surgeon slit the Cacus open for two-thirds its length, the abdomen parted. Like some strange phoenix of terror, a new Cacus struggled out of the dying body of the old, stood defiantly with the upper half of its body raised on the six legs.

Unerringly and with no sign of nerves, Gerry deliberately emptied the hypodermic rifle into the new Cacus. The creature lowered itself to the metal floor, hunching along like a caterpillar. Then it turned and commenced ravenously to devour the soft inner parts of its host's anatomy.

Jerkily it seemed to increase in size, like a speeded-up motion picture of subaqueous life.

The hypo slugs had absolutely no effect upon it.

PETULANTLY Gerry slammed the rifle to the ground, where it bounced lightly.

"That's impossible!" she cried. "I've never heard of such a thing before in the entire Solar System!"

"Maybe it got here from some other System, Lord knows how, and isn't native here. But that won't help subduing it."

"Rats! How about anaesthetic gas? Any bombs available?"

A dozen were turned up. The Cacus having disappeared from view, Kranz daringly ran up to the *Ark*, threw several of the bombs in, and shoved the porte partly closed. In less than five minutes the porte was nudged wide open again, and the Cacus, ugly and flame-wrapped, glared challengingly at the little group of scattered humans. Everyone saw instantly that the new Cacus was slightly smaller than the one before, and was still growing. The amazing re-birth had defeated the anaesthetic gas as well.

"Well," said Gerry cheerfully, "I

guess we'll just have to quit playing games."

CHAPTER V

Duval the Magnificent

SHE quickly set up Lunde's model paralysis ray machine. It worked successfully on Kranz, to everyone's amusement, and Gerry advanced on the *Ark*. Instantly the Cacus, watchfully guarding the porte, emitted a tremendous streamer of fire close to the ground, curling up at the end like an enormouus prehensile tongue. Gerry marked the limit of that flame and stopped outside it. Aiming the paralysis ray at the Cacus, she flipped the activating switch.

Nothing happened. Gerry fiddled with the lens to no avail. She moved closer, only to be forced to scamper out of range of the breath of fire. Then she remembered. Lunde had told her this was a small-scale model, with less than half the power of the working model. The Cacus out-ranged them; they couldn't get close enough to allow the smaller ray machine to take effect.

The Cacus blew another fiery lance at the crew, as if in derision, then turned at some vibration within the ship and moved into its depths. Abandoning its sluggish mode of crawling, the Cacus coiled and raised its tail over its back much in the manner of the scorpion, and trotted off on its six curious legs in search of some incautious engineer who was seeking, perhaps, to sneak out to safety.

Gerry wore a baffled expression.

"That," she pronounced, "beats me. It looks like stalemate."

"Pardon, mademoiselle. Not stalemate." Everyone turned to look at Duval, who had been completely forgotten in the excitement.

"No?" said Strike. "Then it's a pretty good imitation of stalemate. He can't catch us in the open; we can't do anything to him. "

"But, monsieur, every second that passes works in favor of the enemy. Our oxygen supply grows short. It is a situation of the most desperate. I, Duval, say it."

Immediately, though no one had noticed the mustiness of their air before, every person there gestured toward his throat and fumbled quickly with the oxygen valves. Breathing became consciously shallow, slow. There was no sign of panic among these veterans, but uneasiness was a definite presence among them.

Gerry bit her lip. "Any suggestions, Duval? You've played aces every trick so far."

"*Merci bien.* Yes, mademoiselle, I have the suggestion to offer. To combat our enemy, it is necessary that we study him, find his points vulnerable, if such he has."

"And how'll you get that monstrosity under your microscope?"

Duval's teeth flashed. "Ah. To study the present Monsieur Cacus, that is not possible. But his ancestors—eh?"

Startled looks were exchanged.

"Say, that's a thought!" Strike cried, and led a rapid trek across the plain to where the carcass of the first Cacus lay disemboweled. While not scientists in the strict sense, all the Carlyle crew had had scientific education and training. Almost at once a remarkable discovery was made by Kranz.

"Captain, will you take a look at this?" He was holding up the dead creature's funnel-shaped mouth, spreading it wide apart with his hands. Instead of true teeth, the entire inner mouth was composed of a sort of flexible horny growth which probably served for mastication when and if necessary. But the extraordinary thing was that every available crevice was veined with a gray, spongy mass.

"That," said Kranz, "is spongy platinum!"

"And say!" someone chimed in impressively. "The whole satellite must be rank with platinum if there's enough to impregnate the system of any animal life."

EXCITEMENT over a possible bonanza discovery stirred them momentarily. Then Duval's ringing voice held them all again.

"Ah! But more important, I believe, it is that we have here the explanation of the breath of fire! One may read in any textbook of chemistry elementary that when hydrogen or coal gas is made to pass over spongy platinum, it makes of fire, is it not? Well! One may also read that anerobic bacteria, acting upon matter of decomposition in swamps, generate methane, which is one of the constituents—as is hydrogen —of coal gas. Now! All the world knows we have in our digestive tracts many bacteria. Surely, Monsieur Cacus, within, contains anerobic bacteria which act on the decaying matter animal and vegetable, of which a decomposition product must be gas similar to coal gas. Thus the breath of fire!" Duval finished with a flourish.

Everyone agreed: the Frenchman had something there. But how to turn it to advantage? Strike screwed his face up thoughtfully.

"Spongy platinum, then," he groped hesitantly, "is a catalyst—"

Instantly Gerry took him up.

"Of course! A catalyst! And there are several things which, in combination with it, kill its action as a catalytic agent. The halogens, for instance —bromine, fluorine. Or hydrogen cyanide—"

Everyone looked at everyone else, eager to advance Gerry's idea, uncertain just how to go about it.

"That's smart brain-work, Gerry," said Strike, "but our supplies might as well be on Sirius for all the good they can do us. Where'll we get any of the things you mentioned?"

"If it pleases you, mademoiselle—" It was Duval again, and hopes soared at the confidence in his voice. "I, Duval, can perhaps solve this problem. You see these blossoms, so tiny, so unimportant?" He toed one of the little groups of close-clinging growths with the colorless, star-shaped blooms. "They are found, I believe, in one species or another, on all the satellites of Jupiter. We know them well. They are related, one might say, to the nightshade of Earth, because they have poison within them. It is, as you have said it, hydrogen cyanide."

Without the necessity of a single command, the crew went to work. Three of them got furiously busy picking great handfuls of the plants which offered them salvation. Another ran back to the prow of the *Ark*, from which the man in the pilot-house had dropped the important instruments, and had him toss out a space-suit helmet; it would make a perfect pot for boiling.

The little remaining drinking water left in the pilot-house was also lowered. A pair of low-power heat beams was arranged under a tripod made of three of the useless hypo rifles. In a very few minutes the mixture was bubbling merrily—it came to a boil quickly in the absence of much pressure—brewing a vengeful hell-broth for the Cacus.

By the time it cooled to a scummy liquid with a brown substance deposited from the solution, the whole party was laboring for breath, with the exception of Gerry and Duval, who hadn't been in their space-suits as long as the others.

Gerry peered around the row of blue-lipped faces; what she had to do now was hard. Someone had to be chosen to try conclusions with the Cacus: someone had to risk his life, perhaps lose it, in a desperate effort to introduce the HCN into the monster's mouth.

TRUE, it had to be done at close range; so why not try the paralysis ray? But Gerry had come to distrust the ray machine, which was the cause of all the trouble. Perhaps it didn't have the proper power even at close range. If a life had to be lost, it would simply be thrown away if the paralysis ray failed to work. But it might do some good if lost while putting into effect Duval's textbook chemistry.

The men would never under any circumstances allow Gerry to try it, so she was forced to call for volunteers. To the last man, they all stepped forward.

But Tommy Strike stepped farthest, taking the bowl of deadly juice from Gerry's hands.

"My job," he said briefly. "I'm sort

of responsible for this mess. It's up to me to straighten things out."

Gerry's eyes misted. She had no right to refuse him. Someone had to go and Strike, as co-captain, had authority to choose himself. And rigid discipline of the Carlyle expeditions insisted on no needless sacrifice of life or limb. Strike would go alone. Gerry needed all her iron control at that moment.

Strike opened one of the meta-glass gas bombs to allow the gas to disperse, then filled it with most of the poison solution, saving a little for a second try in case he failed. With a crooked grin he waved salute and started toward the *Ark*. Deftly, and before anyone had the slightest inkling of what was happening, Duval slipped up behind Strike, tripped him, and threw him easily to the ground. He caught the meta-glass ball as it floated downward.

Gerry yelled at him.

"Duval! Stop it! You've done enough already; besides, you're not properly one of us at all. Put that down!"

Duval's smile gleamed brightly. "But I have just made a flight impossible from Ganymede to Satellite Five in a scrap heap. Today is my day of luck! I cannot fail!"

"Duval! Come back! We want no quixotic foolishness. If you understood our discipline you'd realize we just don't do things that way."

And Duval of the empty life, whose passing none would mourn, who burned to do heroic things in the grand manner, said soberly:

"And if you, mademoiselle, but understood the French, you would realize that we Gascons *do* things this way."

And he was gone, running rapidly toward the *Ark*. Strike floundered finally to his feet, snarling. He seized the paralysis ray model and set out after Duval as fast as he could go. In a flash the entire crew made a concerted rush in the same direction. Only Gerry's savage commands halted them reluctantly.

Duval reached the porte, peered cautiously in, then vanished inside. Strike followed him less than a half minute later. Then nothing. The watchers outside listened intently at their helmet ear-phones, but no word came from either Duval or Strike. They got in touch with those still trapped in the ship, but the latter reported nothing. That was natural, as the lethal game being played between Duval, Strike, and the Cacus was taking place along nearly airless passages where sound would not carry well.

PRESENTLY the listeners were shocked to hear a high-pitched squeal like that of a wounded horse coming faintly through the ear-phones. It was nothing human; it must have been picked up by someone's helmet mike at a point very close to the screamer. At that, all restraint was flung aside and the crew, with Gerry in the lead, pounded pell-mell over the solid terrain and recklessly into the *Ark*.

They burst in gasping on a climax of terrible ferocity. It was so swift, so savagely sudden, that it was all over before they could throw their feeble powers into the balance.

The Cacus had evidently been prowling down a side passage, and Duval had attracted its attention, then ducked around a corner into the main corridor; when they met, it would be at close quarters where there was no chance for the Frenchman to miss. As the crew tumbled in, Duval was crouching by the passage corner and had just finished yammering at Tommy Strike to stay back and not be a fool. Strike had apparently started in the wrong direction and had just located the real theater of action; he was running purposely along the corridor to back up Duval's play.

And then everything happened at once, like a badly-rehearsed bit of stage continuity in which the actors rush through their parts almost simultaneously.

The Cacus, tail curled up and running on his six legs, skidded furiously into the main corridor of the *Ark*. At once he spied Duval and emitted another of those hideous shrilling sounds. Duval's arm went back, whipped forward. A glittering arc

made a line straight for the ugly, horn-like snout of the beast. Strike, off to one side and several feet behind Duval, dropped to his knees and fumbled with the ray-box. A terrific blast of flame belched out from the Cacus to envelop head and shoulders of the doughty Frenchman.

For a moment it appeared that the fiery stream had caught the container of HCN and demolished it. But no—the Frenchman had been the quicker; he had scored a bull's-eye. By the time the Cacus turned to annihilate Strike, the hydrogen cyanide had entered into combination with the spongy platinum, and nothing but a burst of gas came forth. From that moment the monster was through. Strike brought the miniature paralysis ray to bear, and instantly the Cacus collapsed in a twitching mound of nauseous flesh.

Cathode guns were brought from the arsenal, and the Cacus was ruthlessly blasted out of existence. Then Gerry and Strike hurried to Duval's side. The Frenchman was terribly burned, his face a blackened, blinded travesty of a man. The spark of life was almost extinguished. But as the two knelt beside him, Duval's cracked lips managed a feeble grin.

"Mademoiselle," he whispered, "will have to collect that wager I have won from the good Bullwer. We made the flight. He has lost a week's pay, that one." Something like a laugh bubbled up from his seared chest.

Gerry groaned in anguish.

"Duval! Oh, you magnificent fool, Duval! Why did you do it? Because of me, you must die. That's wrong—"

"Death?" Duval somehow managed a shrug. "Death, yes. But what a death of the most heroic!" And with supreme courtesy to the last, Duval carefully rolled over to face the wall, that a lady might not have to suffer the unpleasant sight of a dying man.

Somberly, Strike helped Gerry to her feet, and she clung to him tightly. For a while they said no word. All about them throughout the ship came the noises of normal life being resumed. The entrance porte clanged shut. Voices rang out. Distantly a generator began to hum. Bulkheads rumbled open again. Oxygen hissed into the airless passages. Feet drummed faintly.

Then Gerry Carlyle gave Louis Duval his epitaph.

"There lies," she said, "a very gallant gentleman."

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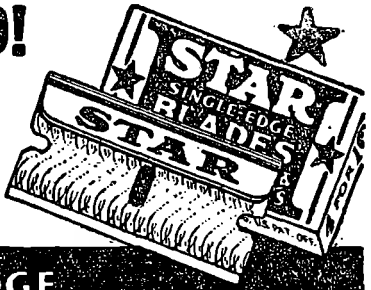

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COSMIC TELETYPE

By CARL JACOBI

Author of "The World in a Box," "Satan's Kite," etc.

JOSEPH RANE was not a scientist in any sense of the word, neither was he a highly educated man, though the villagers at Granite Point generally considered him so. Five years before, when he was finishing his sophomore year at the University of Minnesota, he had accidentally driven his car through the bridge rail at Hastings, and as a result had been forced to end his studies.

Physicians, patching him together, had accomplished what the newspapers termed a miracle. It had been found necessary to remove a section of his brain from the cranial cavity and substitute a piece of silver plate for it. During his convalescence fear was expressed that he would never be mentally normal, but on the day of his discharge a final examination plainly showed this not to be the case.

Rane had been warned, however, to avoid all nervous tension in the future. He might read, but he must read only light novels. He could work, but he must do nothing which would require any serious thought or heavy mental activity. In other words he was sane only by an act of Providence, and any strain to his brain, which had suffered a severe shock, might be fatal.

For two years the young man abided by these warnings. Then tiring of his enforced inactivity, he promptly forgot the past and plunged into study so intense his physician would have been appalled had he been made aware of it.

I have said Rane was no scientist, that he was not a highly educated man. He had, however, those attributes which are the foundation of both: a strong desire to learn and, above all, an almost feverish obsession to experiment.

Then without the necessary background, and without any single fixed objective, he began to study anything which might reasonably fall under the classification of "scientific." For three months he labored at mathematics, advancing by short-cut routes of his own creation, to higher calculus and theoretical physics. Then, tiring of the abstract, he turned his attention to the vibratory scale.

Finally, as the equipment in his private laboratory began to grow in abundance, he purchased a small house near the town of Granite Point, where his experiments could be continued unhampered.

The house was a comfortable one, surrounded by a large apple orchard. In the first month at his new residence Rane both puzzled and shocked the citizens of Granite Point by blowing up every tree of this orchard with some kind of explosive. His exact method of accomplishing this was never quite known, for when his housekeeper repeated to the villagers what her employer had told her, it was thought she was more than slightly mad.

According to the housekeeper, Rane had wired each individual tree with something that was in sympathetic vibration with the wings of a bee. When the trees burst into their spring bloom and the bees came, the explosions followed.

Subsequent to the orchard incident, Rane was seen to construct a square wooden platform in the yard before his house, upon which swiftly took form a weird machine. The tax-collector who called upon him during the month of June described it as "a mess of insulators and wheels with a dial panel that looked like a powerhouse switchboard." Asked the purpose of this machine, Rane delivered the astounding statement that he didn't know yet. He had simply made it and was going to see what it would do.

SUCH events were bound to impress the citizens of Granite Point. The climax of it all came when the local radio station, WYYO, was found insolvent and decided to dispose of its studio and control room fixtures at public auction. Rane, driving up in his Model T Ford was the only bidder for two teletype machines with which the station had received for its listeners *News Flashes of the World.*

Loading the two heavy teletypes in his car, Rane broke all speed records driving back to his house. And after that for a period of more than two months little was seen of the man.

In his house, however, he was a dynamo of activity. First he mounted the two teletypes on a wooden bench, side by side. There to the casual observer the instruments resembled two ordinary typewriters, with the twin paper-rolls in readiness, as if they were waiting to receive a telegraphic message. He next turned his attention to his cosmic radio.

He called it that for want of a better term. The earlier developments of this machine were lost in a frenzy of experimentation. Starting with a study of atomic power, Rane had developed a miniature atom-smasher; later he elaborated his instrument into a device of which he himself stood a little in awe.

"You see," he said one day to his housekeeper, "this machine as it now stands is based on a concept of the relation between time and space. It will project a ray through the fourth dimensional continuum. In other words,

when turned to full power, it will cause a disruption of the space-time coördinates, a channel so to speak which leads from our own three-dimensional world into the fourth dimension. I am convinced that such a channel is being utilized by beings of other planets as a means of communication."

Rane then connected the two teletypes to the machine, with a loading-coil between each. He pulled the switch, set the dynamos in action and awaited results.

Results were cataclysmic. There was a blinding flash of light, a thunderous report which shattered twelve windows in Granite Point and a hiss of flame that swept through three rooms of the house. Rane himself escaped with only burns about the face and arms, but his housekeeper rose up in righteous wrath and promptly gave notice.

May I repeat myself when I say that Rane had the brain—or at least the partial brain—of a true scientist. One failure did not disturb him in the slightest. In fact, he had rather expected it. And he fell to work at once, repairing damaged cables and connections and rewiring his entire machine.

The newly-finished p r o d u c t was quite different from the original version. It was, if possible, more complicated in its control-panel. There was added for no definite reason a huge antenna in the outer yard which stretched from the house to a mast some hundred and fifty feet away.

Again he connected his teletypes. And on the night of the first of August everything was in readiness for his second test. I mention the date, for it was the date of the worst electrical and wind storm that had struck Granite Point in twenty years. Outside the copper antenna and counterpoise were swaying madly in the gale. Lightning tore across the heavens to the accompaniment of an artillery of thunder.

INSIDE his laboratory Rane was oblivious to the storm. For two hours he had sat before the instrument panel, turning and twisting the dials. Above him a huge hour-glass-shaped tube glowed orange and cherry red at intervals, but a deathlike silence hung over the two teletypes. There was only the low whine of the dynamos.

And then abruptly one of the typewriter keys of the teletype trembled and rose halfway. Feverishly, Rane readjusted the paper, turned the dials.

A moment later, with a rush and a clatter, the keys began to pound in and out, the carriage swept from right to left, and the following message came into creation on the rolled paper:

qtsf wuxz24 hk00vey w311mcbq oorhg bvcskha rivslyztuln kklmnwlf rywbsqv 3.2 ddcupj.

tcaw 5

Rane stared at these cryptic words as a wild gleam of triumph entered his eyes. Palms wet, heart pounding, he stood there, scarcely daring to breath, but no further message was printed. Vainly he worked at the dials.

At twenty minutes past four A.M. the teletype moved into action again. But this time, though Rane was wild with excitement, its results were a bit disappointing. The same message was repeated word for word, or rather letter for letter. And thereafter silence.

Exhausted at last, Rane fell into a deep slumber. At dawn he was up again to his machine. What possibly could have been the source of that strange message he had, of course, no way of knowing. But that the events of the night before had been no dream was positively demonstrated by the paper in the roll which still showed its meaningless jumble of letters and figures.

All day he attempted to decipher that message. He put into play the "predominant E solution" of Poe and Doyle, as the only methods he had at his disposal. Neither worked. But that night again at five minutes past twelve and again at twenty minutes past four the first teletype resumed its clatter.

qtsf wuxz24 hk00vey w311mcbq yvers chtq oorhg tfc aijbfw dpiuxqaz ywgfd bvcxzasdf wertyu.

tcaw 5

Here was a different combination of letters and figures. The first, second, third, fourth words and the seventh word were the same as in the first mes-

sage, as was the last word, which seemed to be a signature of some sort.

And then Rane had an idea. Suppose, he told himself, suppose he had in actuality contacted another planet, a planet which biologically, or at least psychologically, was on a parallel with the earth. And suppose the inhabitants of this planet were utilizing the fourth dimension as a means of communication. Surely even an Einstein would agree this was but an elementary supposition.

Very well, why then would messages come through twice in rotation at five minutes past twelve and twenty minutes past four? He glanced at his own radio, and the answer came abruptly. Weather reports!

His brain swung into this channel with a rush as other thoughts followed. Since the postulated planet might—in all probability, was—beyond our Solar System, its system of keeping time would be different. There would be other suns to betoken the noon hour. A night or a day very probably might fall into the intervening time between five minutes past twelve and twenty minutes past four.

Now was he to assume that the message he had received could be transposed into English words? Such an assumption seemed impossible, and the fact that numerals as well as letters had been used seemed to indicate another means of communication entirely.

Fortified by two cups of strong coffee Rane struggled with his solution. Using the single word *weather* as a key word in as many terrestrial languages as he could call to arm, he wrote and rewrote the messages again and again.

BY morning Rane had it. It was in English or an equivalent of English. It was little more than a cryptogram, with letters and groups of letters having different meanings. Apparently the unknown operator was transmitting in a language that had English as a basis, but had phonetically changed it to suit his own conditions.

Decoded, the first message now read:

Vome, Lirius Weather forecast. Winds abating. Atmospheric coronium content 3.2. Warmer.

Unit A.

The second message took Rane only a moment to transpose.

Vome, Lirius. Weather forecast. Northwest winds and warmer. Possible light meteorite shower.

Unit A.

Rane at this point was in a state of nervous frenzy. Sheer exhaustion forced him to go to his bed, where he remained dead to the world for six hours. But as the sun sank and darkness came, he awakened automatically to begin a new vigil at his machine.

The 12:05 message that night was very similar to previous messages, merely a weather prediction. But the 4:20 message was different.

Vome, Lirius. General emergency report. Dromeda, daughter of Calian and most beautiful woman in all Lirius, was kidnapped early today by a man thought to be Tarana, son of the King of Uranus. It is believed Tarana arrived secretly on Lirius on a space ship, travelling out of patrolled space-lanes. A council of war will be held immediately.

Unit A.

Swift on the heels of this breath-taking message, the cosmic teletype broke into action again. The keys pounded over the paper with weird rapidity.

Vome, Lirius. Report of the council of war to all peoples of Lirius. An ultimatum has been sent to the government of the planet, Uranus, demanding the return of Dromeda, plus a full indemnity. If this demand is disregarded, conscription of all able-bodied males of Lirius will begin tomorrow.

Unit A.

Barely had these words made their inked impression on the paper when another astounding event occurred. Joseph Rane, by now beyond all borders of amazement, reached quickly for the

dials and adjusted them as best as he could. The second teletype, silent until now, was responding to outer galactic stimuli. Slowly, as if under weight of serious consideration, the keys tapped off the message:

Geharla, Uranus. The King of Uranus informs the government of Lirius that Dromeda, betrothed by right of conquest, will be married in state to Prince Tarana in a wedding to be held tomorrow night in the light of our four moons. Any attitude other than friendly by the government of Lirius will be taken as a step toward war. In which case we, of Uranus, will not hesitate to train our cosmic radiation towers on Lirius and annihilate her.

IT was now two o'clock terrestrial time, and Joseph Rane was living on nervous energy alone. The hours that followed found the twin teletypes working almost continuously. There were threats and counter-threats between the two planets. There was a mass order for immediate mobilization on Lirius. There was a call to defense on Uranus. At three A.M. came the single insolent flash from Geharla that Prince Tarana had been married to Dromeda.

More messages while Joseph Rane's brain reeled to their potentialities. An expedition of war was leaving Lirius in space-dreadnoughts for Uranus. All threats of the cosmic radiation towers were regarded as bluff. Lirius would have its beautiful Dromeda back or perish trying.

But Rane's already over-strained brain demanded rest at this point. The scientist pulled the switch of his machine, stopping the dynamos, ate a little food and went to bed.

During the following day the teletypes were silent. He occupied his time by cutting the rolled paper messages into sheets and pasting them in a scrapbook. He worked indifferently, toying with an idea which had been growing with him for some time.

If he could receive messages from another world, why couldn't he send them in return? As matters stood now, he knew one of the planets was Uranus, and he assumed that since the inhabitants referred to it with the same name as the people of Earth, those inhabitants must (a) have originated from Earth, or (b) be constantly aware of the scientific developments on Earth through a method known only to themselves.

At 12:05 the following flash came over the first teletype:

Vome, Lirius. The attack expedition, consisting of 25 space dreadnoughts, 6 space gun-ships, and 3 patrol discs has reached Oberon, one of the four moons of Uranus. Landing on Uranus so far has been an impossibility, due to the cosmic radiation towers, which have been found to be an actuality. The war is now in a state of siege.

Rane frowned. Weird and bizarre as this all was, he had a feeling deep within him that it was somehow familiar. Somewhere, long ago, he was sure he had heard of the same facts, the same conditions. And yet such a thought was impossible.

As for two-way communication, even granting that he might be able to contact either one of the two planets, using the same code, it was doubtful whether or not he would receive a reply, due to the very great excitement there.

His sympathy, he found mounting steadily in the direction of Lirius, which he guessed was the smaller planet of the two, and which, though on the offensive, had a righteous cause for indignation.

Abruptly a memory of his old school studies struck him hard—the Trojan War of Greek mythology. This was comparable to the capture of Helen of Troy, wife of Menelaus by Paris and the classical incident of the wooden horse, which had so excited his boyhood imagination.

Joseph Rane sat down before the first teletype, threw over the switch and adjusted a control knob. An instant later he began pounding out a message.

To Vome, Lirius. From Joseph

Rane, Granite Point, Earth. Have received all messages pertaining to your war with Uranus on machine of my own construction. Exact parallel of your trouble occurred here in past ages. Can advise means of attack. Crude but can be revised to suit your conditions. Answer.

FOR five endless minutes the teletype remained in frozen silence. Then with a rush of type the reply came:

Our observations led us to believe all life ceased to exist on Earth a hundred or more years ago. If you have suggestion pertaining to our war, gratitude of people Lirius would be great. We await your reply.

Rane drew a long breath and smiled grimly. To a scientist the wooden horse of Troy was anything but scientific, but to a scholar it had stood through the ages as a classical means of deception. His hands began to move over the keys as he typed out peculiar word combinations.

Rane was no dabbler in words, no writer, no scribe, but he did himself royally on that last and final message. He called to arm all the mythology he knew, and he described the wooden horse incident with great enthusiasm. Could not, he queried, a similar trick be attempted on Uranus? He clicked out his name with a flourish.

Three hours passed. The would-be scientist smoked cigarettes chain-fashion. He drank two cups of black coffee. The teletypes stood silent. Outside, rain of a dying storm lashed itself against the windows. Another hour passed and another, and then

Vome, Lirius. General announcement to all peoples of Lirius. We are victorius! Dromeda is back, and the defeat of Uranus is an actuality. No indemnity will be demanded, but Lirian transports will hereafter have unrestricted rights in the spaceways. Defeat of Uranus came about in the following manner:

At 29:18, Lirius time, a message was received by the Unit A operator at Vome, purporting to come from Earth and suggesting a means of attack, which, though crude, struck a responsive chord with the commandant of the Lirian Expeditionary Force.

The suggestion involved the use of a wooden horse, hollow and large enough to secrete a number of Lirian soldiers. It was believed the word, "horse," referred to higher form of animal life which was evolved on Earth during that planet's Quaternary or Post Tertiary geologic period. This object was to be landed on Uranus, where, arousing curiosity, it would be taken within the walls. Under cover of Uranian night the concealed soldiers were to leave their hiding place and demolish the cosmic radiation towers, which heretofore had made attack impossible. This plan was immediately set into operation, a life-size image of a Voldadon, that herbivorous monster of the Lirian polar jungles being substituted for a "horse."

With such favorable results we can only express our full gratitude and appreciation to the Earth operator. The Interplanetary Diplomatic Council is now in session, outlining a plan of appreciation.

For the first time in many hours Rane permitted himself to sink back in his chair and relax slightly. What he had done, he told himself, was no more than any man in similar circumstances would have done. What was important was that a machine of his own making was successful beyond his most remote dreams, opening an unlimited path to the future.

He smoked a cigarette quietly, enjoying the atmosphere of rest and quiet that now flowed about him. Across on the far wall the hands of an electric clock moved slowly around the dial.

Suddenly the teletype began again. And as Rane read and decoded the message his heart leaped within him.

Vome, Lirius. To Joseph Rane, Granite Point, Earth. This is to notify you that a good-will expedition will leave from this planet to your world via one of our super-space transports. Dromeda, the most beautiful woman of

Lirius, will be one of the passengers. Advise you to increase signal strength and broadcast power tone at intervals of five minutes, Earth-time, as guide beacon. Without this it is doubtful if we could find our way through uncharted space. Do not broadcast these facts as we wish to make our visit a complete surprise. Will inform you when to begin power tone on moment of departure.

Unit A.

RANE sat there stupefied, his eyes blank, his jaw slowly dropping open. Seconds passed, and there was no sound save the wind as it moaned around the outside corners of the house. Then with a leap he was out of his chair and across to the rheostat control. They needed more power, did they? Well he had an auxiliary dynamo at his disposal, and he would give it to them. His hand trembled as it grasped the knob, began slowly to turn it to the right.

The motor hum increased to a high-frequency drone that seemed to tremble the very foundations of the house. The hour-glass tube changed from cherry red to a gleaming crimson. Louder roared the dynamos, as the control panel vibrated to a creamy whitish blur.

He returned to the teletype and waited. Presently messages began to come in in swift succession. There was an announcement to all peoples of Lirius that preparations for the interplanetary expedition were already on the verge of completion. There was a statement by the King of Lirius, bidding good fortune and success. And there was a long statement, signed by the ten members of the Lirian Diplomatic Council, expressing appreciation to the Earth operator in the warmest terms.

Rane frowned slightly. The inhabitants of the other world were overdoing it a bit, he thought. After all, he had only sent them a suggestion. Somehow there seemed a lack of sincerity in the various communications he had received.

But abruptly the teletype clicked off the following:

Vome, Lirius. Transport now leaving. Begin power tone. We will contact you at intervals.

Unit A.

Rane tripped a switch, disconnecting the keyboard, and pressed a small contact button. A low, droning roar filled the room. Holding the power tone steadily, he took out his watch and laid it down before him. Intermittently at exact five-minute intervals his hand pushed down on the button. Between those intervals he switched the teletype back in, ready for any message that might be transmitted by the transport en route.

A message did come, rattling off the keys at terrific speed, but this time Rane stared at it with puzzled eyes.

3inqv mysyel mc8qux uu3nef qb ucaekch. gclmwuebd rsnioc 3inqv mj xvop lkjhg. zxc utos qb dawquipmn.

This was odd. The key which he had applied to all previous messages and which in the last few hours he had learned practically by heart, failed absolutely to decipher the message. The grouped letters and numerals seemed to have been formed in another language-cipher entirely.

"Some military code, no doubt," Rane mused aloud. "They're giving orders regarding the defeated planet, Uranus."

But his eyes darkened perceptibly, and when after three more five-minute intervals of sending the power tone, a second message, likewise undecipherable came through, he turned the teletype over to transmission and went to work on the keyboard.

Unable to read your last two communications. What are you saying?

Rane.

NO reply came to this interrogation. Puzzled, Rane took up paper and pencil, placed the strange messages before him and attempted to decode them. But he had no key word to work with this time, and he failed in each attempt.

Try though he would to disregard it, a lurking suspicion began to enter a far corner of his brain. Why should

the Lirians suddenly begin to send messages in a cipher which they knew he could not understand? Obviously, because they did not want him to know what they were saying. But why?

Abruptly he stumbled upon a clue by accident. A single word, 3inqv, he noted, had been repeated several times, and contained a similar number of characters as the word *earth*. Hazarding a wild guess, he substituted "earth" for this combination, following with the other letters and words in a trial and error method. He worked rapidly, in between intervals of sending the power tone. Completed, the message bewildered him:

Earth power signal coming in clearly. Advancing toward Earth under full speed. All guns in readiness.

He read that last sentence three times while his lips tightened, and a queer glitter entered his eyes. The second communication in the new cipher was even stranger:

Reinforcements now leaving Lirius to aid you. 26 space dreadnoughts, three speed cruisers. Proceed with utmost caution. Attack immediately on arrival.

It was then that Rane jerked out of his chair, voicing a startled oath. He saw it all now, saw it clearly. And the cunning audacity, the treachery of it cut into him like a knife. This was no good-will expedition the Lirians were speeding through space. All statements to that effect had been a blind, tricking him into aiding them.

Drunk with power from their recent conquest of Uranus, the Lirians now planned to subjugate the earth. For years they had been aware of developments on earth, but through some error in calculations or observations they had come to believe that terrestrial life had ceased to exist. Made aware of their mistake, they now intended to utilize their advantage of the situation.

The cold-blooded deceit of it staggered Rane. One outstanding fact overwhelmed him with its significance: it was his actions alone that were responsible for this trouble. He alone could stop it. He must do so!

The watch showed that the five minute time when the power-tone was to be sent was overdue. Even as he raced across the room to shut off the dynamos, the keys of the teletype swung into action.

No power tone. Send immediately.

He stood there, galvanized to immobility. Would the simple discontinuance of his signal beacon be sufficient to halt the invaders before they reached their destination? He didn't know.

Demand power tone be sent at once. If not, dire consequences await you. Answer.

Still he made no move. Was this all some mad dream, some nightmare from which he would awake to laugh at his fears? The stark reality of the room, the humming dynamos, the printed words on the rolled paper told him only too clearly it wasn't. In his mind's eye he saw huge battle-craft from outer galaxies, armed with strange weapons, landing to spread fearful havoc. He saw cities and towns annihilated by forces the inhabitants could neither see nor understand. He saw—

Rane, Granite Point, Earth. Give you two minutes to send power tone. Reception vital or we cannot proceed. If you do not reply at the end of that time we will blast you through our four-dimensional teleray. Remember we are in wave-length contact with you. You are no doubt aware by now that this is an expedition of war. In this respect we promise you complete safety to yourself. We are desirous only of complete conquest of Earth, which will then be placed under our government as a planetary possession. We did not lie when we stated that Dromeda, the most beautiful woman in Lirius, is aboard this transport as a passenger. If you obey all instructions and do as we order, we promise you her hand in marriage, also high position in Lirian court circle plus large share of loot. Give you two minutes to send power tone. If not heard at the end of

that interval, we discharge teleray into your station. You cannot escape.

RANE stood there like a man in a daze. His fists clenched slowly; he could feel a pulse pounding at his temple. On the instrument table the watch ticked away the seconds.

One minute dragged by. Every detail of the room seemed to stand forth with stereoscopic clarity now. The two silent teletypes squatted there on the wooden bench, mocking instruments of destruction. The drone of the dynamos sang a threnody of death.

Twice Rane attempted to rush to the door and escape the house. Each time a peculiar bluish spark spat across the binding posts on the instrument panel, and he felt a magnetic attraction radiate from it to thwart his will. Realization came to him that this time the Lirians meant what they said. They were still in contact with him, and they were exerting an unknown power to prevent his escape. It was a physical impossibility for him to leave the room.

Thirty—fifteen seconds more. He stared at the watch, glanced at the control-button and smiled grimly. He slid slowly into the chair before the instrument desk. How simple it would be! A turn of a switch, a pressure on a rubber knob, and his own life would be saved. And yet—

Two minutes slipped by. His mind made up, Rane sat rigid. He made no move to send the power tone.

And then it happened! A terrific, grinding roar belched forth from the bowels of the machine. A huge cloud of greenish black smoke shot upward, and a span of white fire arced across the cables to envelope the scientist in a shroud of flame.

Like some monstrous gattling gun the thunderous crashes pounded madly through the room. The fire rose higher to lick hungrily at the ceiling. Then it died, to reveal a mass of twisted smoking metal with the body of Rane lifeless beside it.

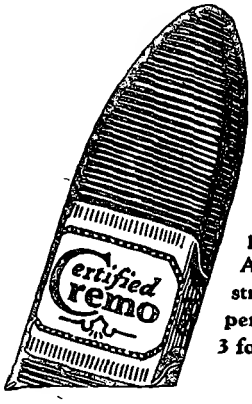
* * *

On August 5th the *New York Times* carried the following small article on the bottom of its third page:

What was thought to be a new dark star of unknown origin was wrapped in mystery today after Professor Howard K. Althra, eminent astronomer of Mount Wilson Observatory, revealed his observations of the past two nights had ended in failure.

Two nights ago Professor Althra, aided by almost perfect atmospheric conditions, sighted a dark point moving out of the constellation Gemini, between Saturn and Neptune, and heading toward the earth at terrific speed. Professor Althra was able to chart the course of this body through space by its frequent and unexplainable variations of course, but he was unable to determine definitely whether it was a large body seen at a great distance or a small body close to earth.

"At the time of the last observation," Professor Althra stated, "it almost seemed as if it faltered there in space, then turned about and headed back for the constellation Gemini. This, of course, is impossible, and I am unable to state definitely what the nature of the object was."



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RAMBLING Through

Micromegas Strides Across the Universe with the Super-Speed of Light in the Oddest Cosmic Tour Known to Man!

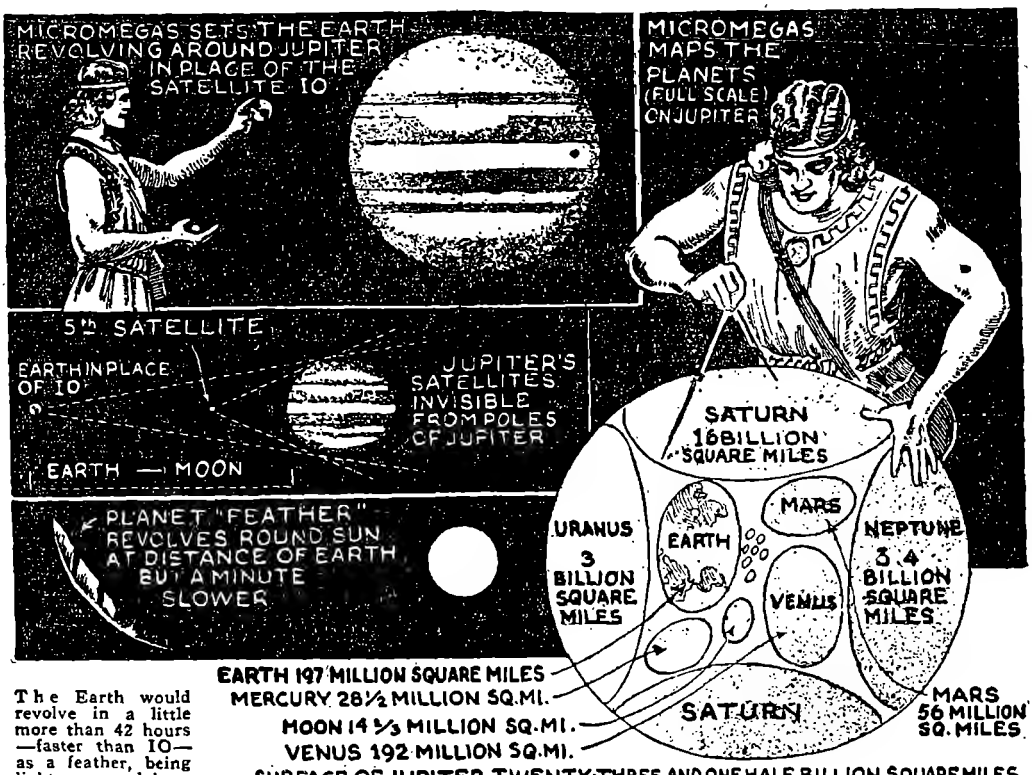
By C. P. MASON

Author of Many Authoritative Articles on Science

NEARLY two hundred years ago a writer of scientific fiction imagined a visit to our Earth by an inhabitant of the system of Sirius (the "Dog Star"), who looked almost in vain for any signs of life. *Micromegas* ("little-big"), for so he called his hero, was several miles high and, accompanied by a "dwarf" from Saturn, who was a mere three thousand feet tall, he strolled around our planet for hours, unable to see any activity upon it until his attention was attracted by a small, insectlike moving object, which proved to be a ship.

However, while man would be too small to be observed by a visitor of such proportions, the Solar System would be still too big and far-reaching for this giant to grasp its proportions. The task of visualizing our Sun and its planets as they are—not as spots in the sky, nor on a piece of paper, but as three-dimensional objects—must be undertaken by a more stupendous being.

Let us suppose a Micromegas capable of walking through space with the speed of light; he is 180,000 miles high, and strides 80,000 miles at a step. Then, when he makes his strides at the same rate as we do when walking at a


MICROMEGAS SETS THE EARTH REVOLVING AROUND JUPITER IN PLACE OF THE SATELLITE IO
5th SATELLITE
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SURFACE OF JUPITER TWENTY-THREE AND ONE HALF BILLION SQUARE MILES

The Earth would revolve in a little more than 42 hours—faster than IO—as a feather, being lighter, would revolve more slowly.

Jupiter's surface is greater than those of all other planets.

RAMBLING Through the SOLAR SYSTEM

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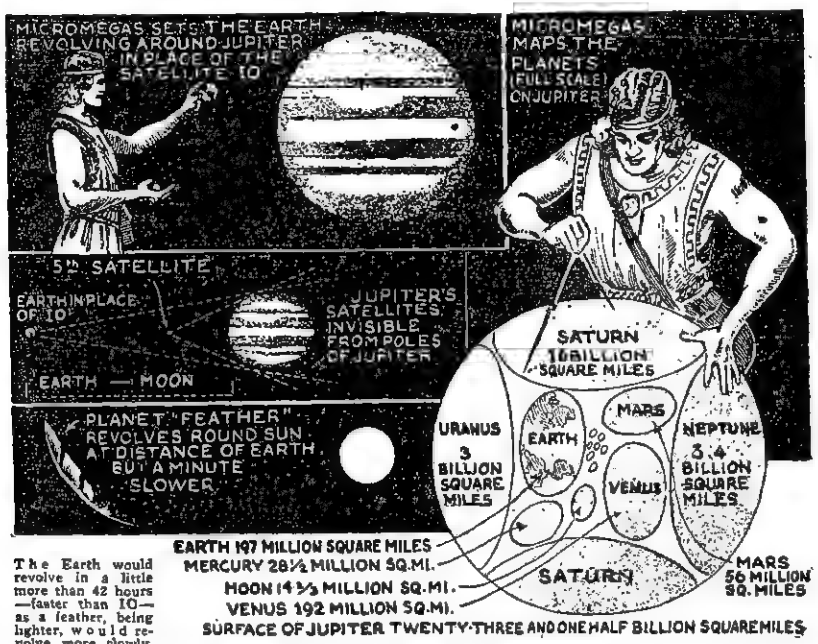
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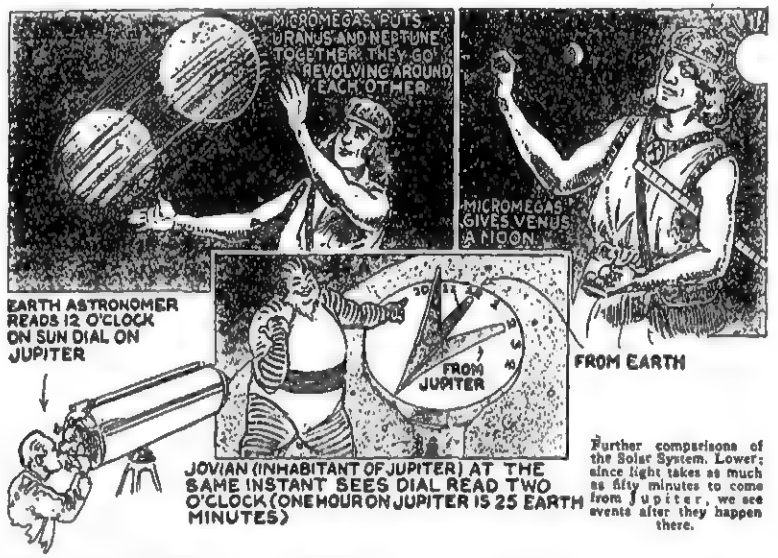
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FROM JUPITER
FROM EARTH
JOVIAN (INHABITANT OF JUPITER) AT THE SAME INSTANT SEES DIAL READ TWO O'CLOCK (ONE HOUR ON JUPITER IS 25 EARTH MINUTES)

Further comparisons of the Solar System. Lower; since light takes as much as fifty minutes to come from Jupiter, we see events after they happen there.

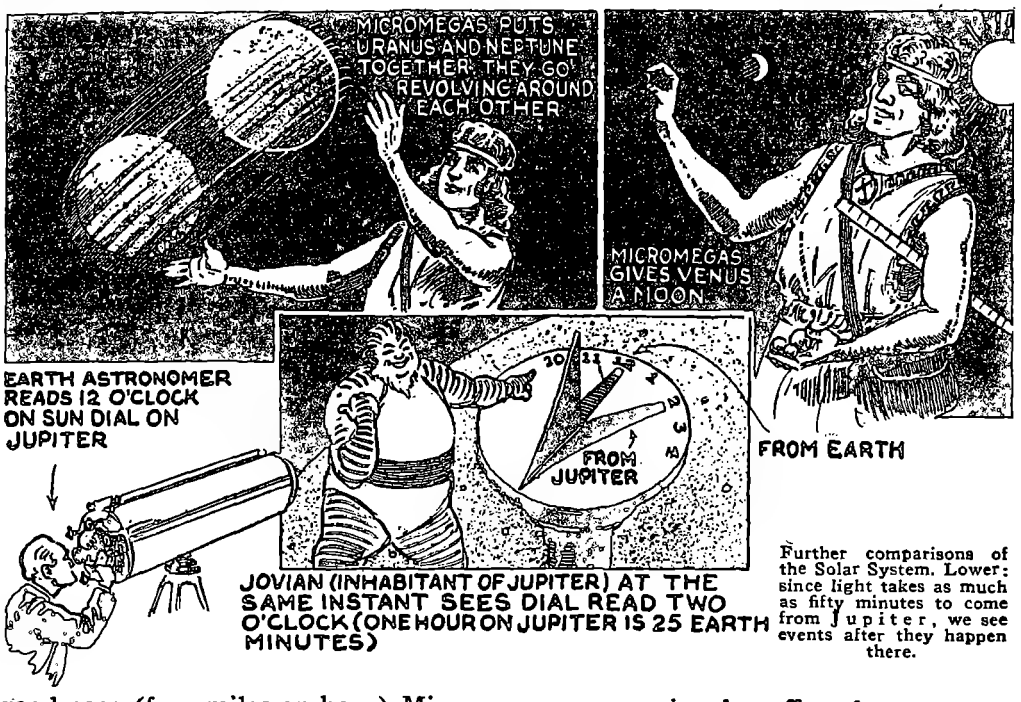
THE NEAREST PLANET

THE Sun has been visible to him from afar; he approaches it, and stands before it, unaffected by its light and heat, to examine it closely. It is a ball of compressed gas, with a whirling, cloudy surface, more than four times the height of the visitor. It is, following out the proportions we have given, 27 feet, 3 inches in diameter, and weighs 436 tons; about the dimensions of an 80,000 gallon water tank, compared to ourselves. From the globe come occasional puffs of gas, two, three, sometimes ten feet long. In the area within thirty feet of it, there is a very, very thin vapor—hardly more than an odor.

FROM the Sun, Micromegas turns to look for its planets—if any; and against the background of space, full of distant stars—none within a hundred and fifty thousand miles of him—he sees some bright objects, moving very slowly.

To the nearest it will take him—at the speed of light rays leaving the Sun—two and a half to four minutes to walk. This is the planet Mercury, which is between 900 and 1360 feet from the Sun, according to its position in its eccentric orbit. It is a little ball, an inch and a fifth in diameter, comparable to half a dollar in its disc. One side, always turned toward the Sun, is baked hard and cracked; the other eternally cold. Moving in its orbit more rapidly than any other body in the

the SOLAR SYSTEM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JOVIAN (INHABITANT OF JUPITER) AT THE SAME INSTANT SEES DIAL READ TWO O'CLOCK (ONE HOUR ON JUPITER IS 25 EARTH MINUTES)

Further comparisons of the Solar System. Lower: since light takes as much as fifty minutes to come from Jupiter, we see events after they happen there.

good pace (four miles an hour) Micromegas, like light, covers 170,000 miles a minute. To him, 2,645 miles seems just as an inch does to us; and, with strength proportioned to his size, two and a half sextillion (2,500,000,000,000,000,000,000) tons offers to him the same weight that a pound does to us. We shall describe the distances and weights of the Solar System in the terms corresponding to Micromegas' scale of sensations.

THE NEAREST PLANET

THE Sun has been visible to him from afar; he approaches it, and stands before it, unaffected by its light and heat, to examine it closely. It is a ball of compressed gas, with a whirling, cloudy surface, more than four times the height of the visitor. It is, following out the proportions we have given, 27 feet, 3 inches in diameter, and weighs 436 tons; about the dimensions of an 80,000 gallon water tank, compared to ourselves. From the globe come occasional puffs of gas, two, three, sometimes ten feet long. In the area within thirty feet of it, there is a very, very thin vapor—hardly more than an odor.

FROM the Sun, Micromegas turns to look for its planets—if any; and against the background of space, full of distant stars—none within a hundred and fifty thousand miles of him—he sees some bright objects, moving very slowly.

To the nearest it will take him—at the speed of light rays leaving the Sun—two and a half to four minutes to walk. This is the planet Mercury, which is between 900 and 1360 feet from the Sun, according to its position in its eccentric orbit. It is a little ball, an inch and a fifth in diameter, comparable to half a dollar in its disc. One side, always turned toward the Sun, is baked hard and cracked; the other eternally cold. Moving in its orbit more rapidly than any other body in the

Solar System, it is traveling nearly an inch a minute when near the Sun; and at this slow speed, it will complete its revolution around the Sun in 88 days.

EARTH

LEAVING Mercury, the gigantic explorer walks for three minutes toward the brightest object, except the Sun itself, which is to be seen. This proves to be nearly three inches across, a silvery looking ball, where the sunlight falls on it, but quite dark on the opposite side, where there is nothing but starlight. This is the planet Venus, 2100 feet from the Sun. Micromegas estimates its weight at 34 ounces, twenty times that of Mercury.

(It must be understood that in this whole area he has traversed—up and down, as well as sideward, for he can travel, like light, in any direction—more than two thousand feet around the Sun, there is nothing—*nothing*, but these two small balls and the Sun itself.)

Resisting a temptation to drop the silvery-looking planet into his coat pocket, Micromegas walks on another two minutes and a half, and finds a third planet—our Earth—at 2950 feet from the Sun. But, as a contrast to the first two, this ball, a very slight fraction of an inch larger than Venus, and half a pound heavier, has a companion. Another little ball, about eight-tenths of an inch in diameter and weighing half an ounce, is traveling with it, a little more than seven feet away; so that the explorer cannot quite touch both with his fingertips at once.

JUPITER, THE GIANT PLANET

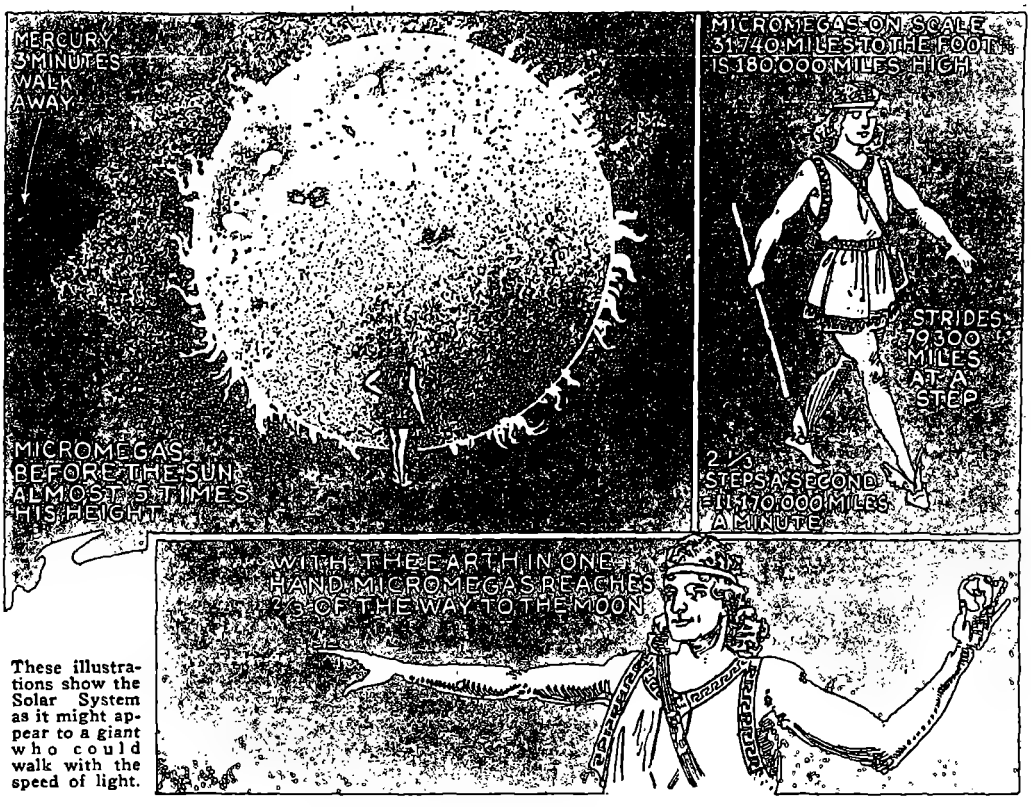
THE Earth and the Moon present a contrast; Earth is slightly moist (for to Micromegas an ocean seven miles deep is but dampness, and a mountain five miles high will not scratch his finger); but the Moon is perfectly dry, and freckled. Then, too, while Mercury keeps the same face always to the Sun, the Moon keeps the same side toward the Earth, so that the Sun gradually illuminates all parts of it. However, since this takes more than 27 days, Micromegas does not wait for a demonstration, but goes on.

The first three planets have been lying almost in a straight line, but the fourth is off at one side. The investigator cuts across to it and, in less than seven minutes, he finds a ball a little more than an inch and a half in diameter, rather reddish-colored, and weighing a little more than a quarter of a pound. This is Mars; and careful scrutiny showed two specks, too small to be seen clearly, but gleaming in the distant sun—an inch and a half, and four and a half inches, from their planet. These are the tiny "moons" of Mars—Deimos and Phobos.

Micromegas has now exhausted the resources of the region a mile from the Sun: five small bodies and two specks. Only their glitter has enabled him to find them. But, two miles beyond, he can see the sunlight reflected from a body of, apparently, considerable size. He pursues his path directly toward the planet Jupiter. En route, he observes, as he draws near to them, occasional specks which become distinct only by their motions against the background of stars.

One, indeed, draws him out of his way, several hundred feet downward; it is about a half-inch in diameter—the asteroid Pallas. Another time, as he turns upward toward the gleaming disc of Jupiter, he strikes his ear against a bit of grit—thus hurling one third-rate asteroid completely out of astronomical reckoning. By the time he is within a quarter mile of Jupiter, its disc looks as big as that of the Sun, now nearly three miles back; but Jupiter is only a reflector. And, on each side of Jupiter, he sees two small bodies, one of which shifts its position enough to be perceptible while he is approaching it.

Jupiter, a ball nearly three feet through and weighing 830 pounds, is turning on its axis slowly, but surely; as he verifies by holding a pencil against it. The four moons range in distance from 7 to 35 feet, and in size from about three-quarters of an inch to an inch and a quarter. The light from the Sun is only one three-hundredth as strong as it had been at Mercury; but Micromegas makes out three more little moons, the innermost of which is moving perceptibly as he looks at it. In fact, it is turning around Jupiter al-


MERCURY 3 MINUTES' WALK AWAY
MICROMEGAS BEFORE THE SUN ALMOST 5 TIMES HIS HEIGHT
MICROMEGAS ON SCALE 31,740 MILES TO THE FOOT IS 180,000 MILES HIGH
STRIDES 79,300 MILES AT A STEP
2 STEPS A SECOND IS 170,000 MILES A MINUTE
WITH THE EARTH IN ONE HAND MICROMEGAS REACHES 2/3 OF THE WAY TO THE MOON

These illustrations show the Solar System as it might appear to a giant who could walk with the speed of light.

most at the rate that Jupiter rotates.

From here, the astronomical golfer cuts back cross-lots, having observed Saturn at a wide angle from the Sun. This journey exceeds the length of the tour of the five preceding planets, being over six miles; but he feels himself rewarded by the spectacle.

Saturn, like Jupiter a ball flattened as he can see at the poles (or, rather, bulged out around the waist) by its rapid rotation, just visible to his eye, is about twenty-eight inches in diameter; (two and a half inches less through from top to bottom) and weighs 250 pounds. Around it there is a transparent flat curl of mist, paper-thin, and more than five feet in diameter. Outside this he notices a large moon, an inch in diameter, and four much smaller ones, between 3 and 250 feet from the planet's ring.

PLUTO, THE LAST PLANET

MICROMEGAS looks around. His eyes, though sharp, are not telescopes and these six planets seem to exhaust the Solar System. It would be a good eighty minutes' walk back to the Sun; and nothing could be expected on the way except another asteroid or two, too small to be seen clearly with the naked eye. But it will be a good four-and-a-half years' walk, without stopping, to the next star; and so he decides to put in a little more time investigating the outer regions. By good luck, he executes another bend in his course around the Sun, and an eight-mile walk brings him to Uranus—a ball about a foot in diameter, and weighing, as he judges, about 39 pounds; with four moons, none half an inch in diameter, surrounding it at distances of from four to eleven feet, and revolving from top to bottom instead of sideward.

Another turn, and nearly five hours' walk, and he reaches Neptune—another twelve-inch 45-pound globe, almost lost in the gloom. It has one lone moon, an inch and a quarter across, circulating around it, seven feet away. He is now seventeen miles from the sun which, feeble as it seems, in comparison with its nearby glow, still burns nine

million times brighter than Sirius, the next star in splendor.

In such circumstances, at a distance of seventeen miles from the Sun, he is continuing his walk, and it may be a long time before he finds Pluto, which cannot be seen at any great distance without telescopic aid. He brushes occasionally through a wisp of thin vapor, a few inches across, which is a comet in retirement; but his search will be a long one, it may be hoped. For Micromegas has a few ideas of rearranging the supposedly uninhabited Solar System in better order; which would be more interesting to science than comfortable to the inhabitants of this planet, and perhaps others, as the illustrations suggest.

At this point the skeptical reader may be pardoned for wondering if these figures about the comparative sizes of the planets are any more authentic than this story about a superplanetary giant.

ACCURATE PREDICTIONS

They are! Astronomical happenings can be predicted with a good deal more accuracy than most things on Earth. We can tell long in advance where the Moon will be at a certain time; when there will be an eclipse or a *transit* (passage of a planet across the Sun's face), etc. These are figured out years in advance; while the weather bureau has trouble in telling whether or not it will rain tomorrow.

There are some holes in our knowledge. We know the comparative distances of the planets quite exactly in terms of the average or *mean* distance of the Earth from the Sun: that is the astronomer's yardstick, or "astronomical unit." But there may be an error of one part in 800 in that yardstick, because of technical difficulties in observing the Sun. Fortunately for our climate, but unfortunately for the observers, nothing in the heavens can be noted exactly when the Sun is near it, except during a total eclipse. That is why astronomers go halfway around the world to make observations at an eclispse.

However, for practical purposes, the figures will serve.

HOW SPACE IS MEASURED

ASTRONOMICAL calculations require a great deal of corrections for technical reasons—too many to describe. Before telescopes were invented, very detailed calculations were made as to the motions of the planets. The astronomers had an exact map of the orbits of the planets, all but the scale. The question was: "How far is the Earth from the Sun?" When that was known, the rest could be figured.

They began by thinking it might be five or ten million miles; astronomers, like financiers, were not used then to big numbers. Up and up the estimate went. Now we are told the distance is 92,897,416 miles. The last four figures might as well be zero; there may be an error of sixty thousand miles, one way or the other. But that is a very small margin of error. As a matter of fact, there are only four instances, each year, when the Earth is at that distance.

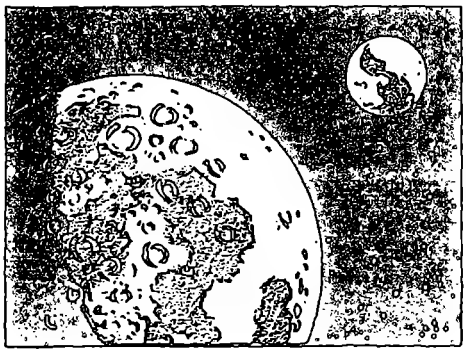
It is possible to determine the weights (or rather, masses) of bodies which have others revolving around them. The time taken by a planet, or a moon, to revolve around its *primary* body (Sun or planet) depends on the distance and on the masses. If a feather (instead of the Earth and Moon) were placed in the orbit of the Earth, it would revolve around the Sun in a little more than a year; it would move less rapidly, because the sum of its mass and that of the Sun would be less than that of the Earth and the Sun.

The difference would be very slight, but it would be there. On the other hand, if Jupiter were where the Earth is, it would revolve around the Sun in appreciably less than a year. But collating millions of observations, the astronomers have obtained fairly good ideas of the masses of the planets, as well as of their dimensions and distances.

We know the speed of rotation of the Earth, because it furnishes our unit of time (the day); we know that of Mars. We are convinced that Mercury turns on its axis only once as it goes round the Sun; there is one day in the year on Mercury, and *only one time of day* (roughly) at any given point on Mer-

cury. There is only one day in the month on the Moon. We know that the planets Jupiter and Saturn are revolving with terrific speed, because we see spots on their cloudy surfaces go by. In fact, so fast does Jupiter revolve that he further turns one-twelfth of the way round while the light is reaching us. If a big enough sundial could be built on Jupiter so that we could read it with a telescope, it would say 2 o'clock at the very instant that we saw it reading 12 o'clock! (That's relativity for you.)

As a matter of fact, Jupiter has natural sundials; and, by reading them, astronomers made one of the fundamental discoveries of science: that light takes time to cover distances. There is no such thing as a "full moon" visible on Jupiter (though Jupiter has four big moons and some smaller ones) because, when a moon is full, it is eclipsed; since the shadow of Jupiter is too big to escape. Astronomers discovered that, when Jupiter was nearest us, these eclipses could be seen several minutes earlier, because the light had many million fewer miles to go.



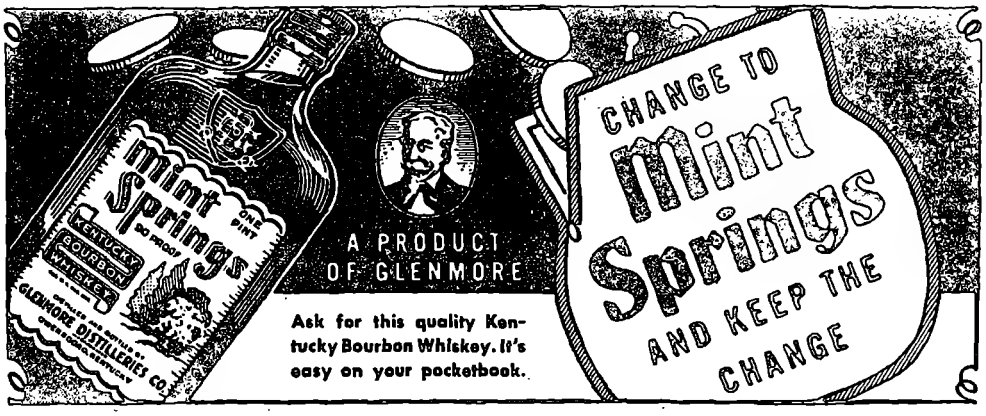
IN THE NEXT ISSUE

THE STAR PARADE

A Novelet of Hollywood-on-the-Moon

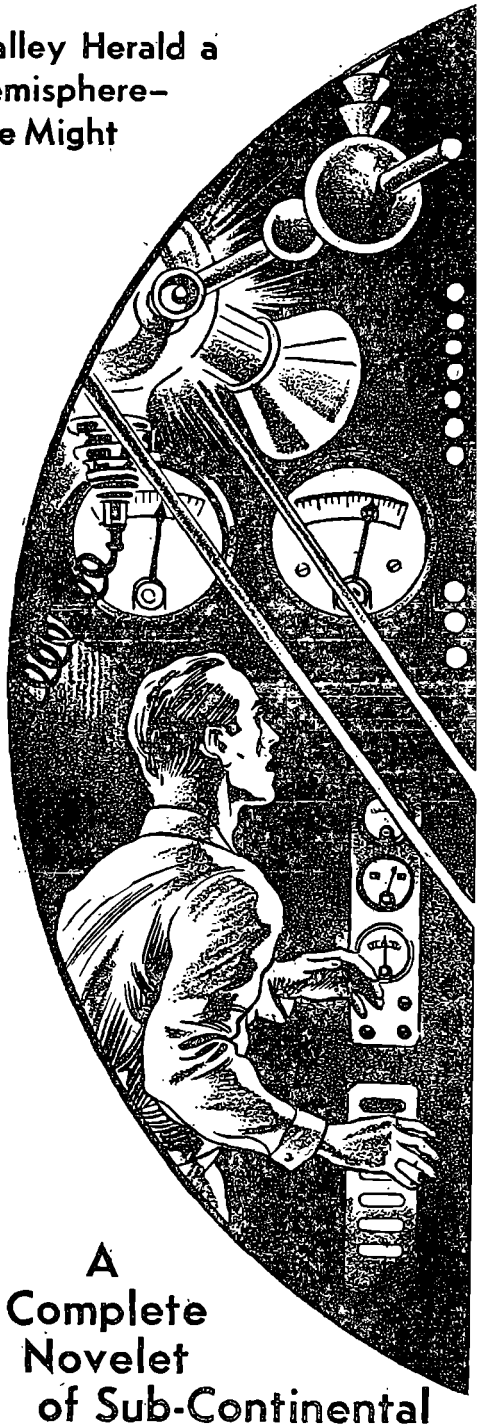
By HENRY KUTTNER

—and Many Other Stories



THE CHALLENGE

The Summer Snows in Death Valley Herald a Grim Conquest of the Western Hemisphere—But Scientific Wizardry Arrests the Might of a Sunken Civilization!



A Complete Novelet of Sub-Continental Forces

CHAPTER I

Screen Seventy-Seven

THE three men stood together in their domed observatory, which was like an ancient fortress on the highest ground, beyond the reach of ordinary mortals, and studied the intricate-looking machine before them.

Hilton Fore was the tallest of the scientific trio that had banded together for the purpose of mastering the secret of television. He was an easy-going fellow, with merry eyes, a fighter's heart, an insatiable ambition—and two million dollars. Here, on Mount Helix, in Southern California, his wizardry as a technical engineer had resulted in the completion of their great observatory.

Fore smiled complacently to himself as his fingers played with one of the rheostats of his Televisor. He was certain that if radio waves could encircle the Earth, so could the vision of man, if properly curved and guided.

Monty Herndon, cool and level-headed, agreed with him. Blond, with thick, white eyebrows, Herndon was an electrical physicist, the world's greatest authority on Hertzian waves. But Blackie Margin, the third of the three friends, a famous young astronomer, could see no sense in studying the Earth, when there were the vast worlds of outer space to intrigue one. Often the other two wondered why they had included him on their project.

"Another year," said Hilton Fore, awe in his voice, "and our Televisor will be sufficiently perfected to encompass the continents, the stratosphere, and the earth's sub-strata."

Monty Herndon lighted a cigarette.

THE CHALLENGE OF ATLANTIS

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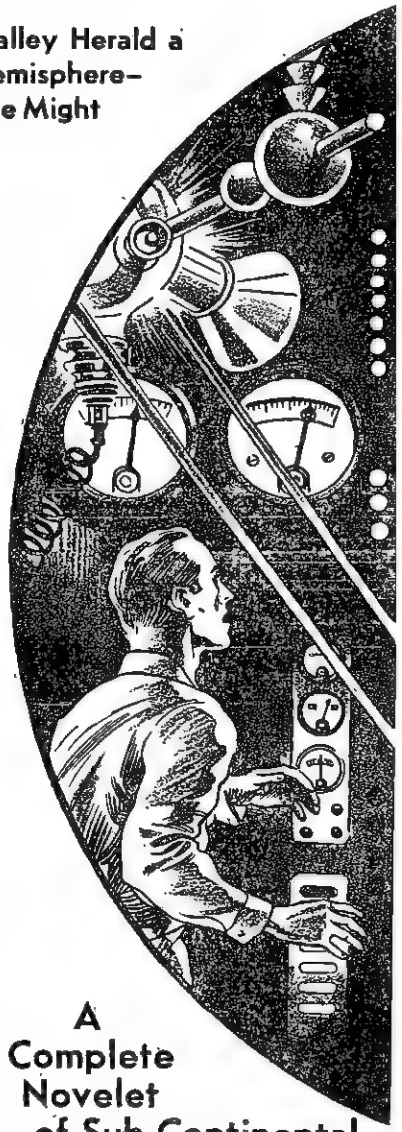

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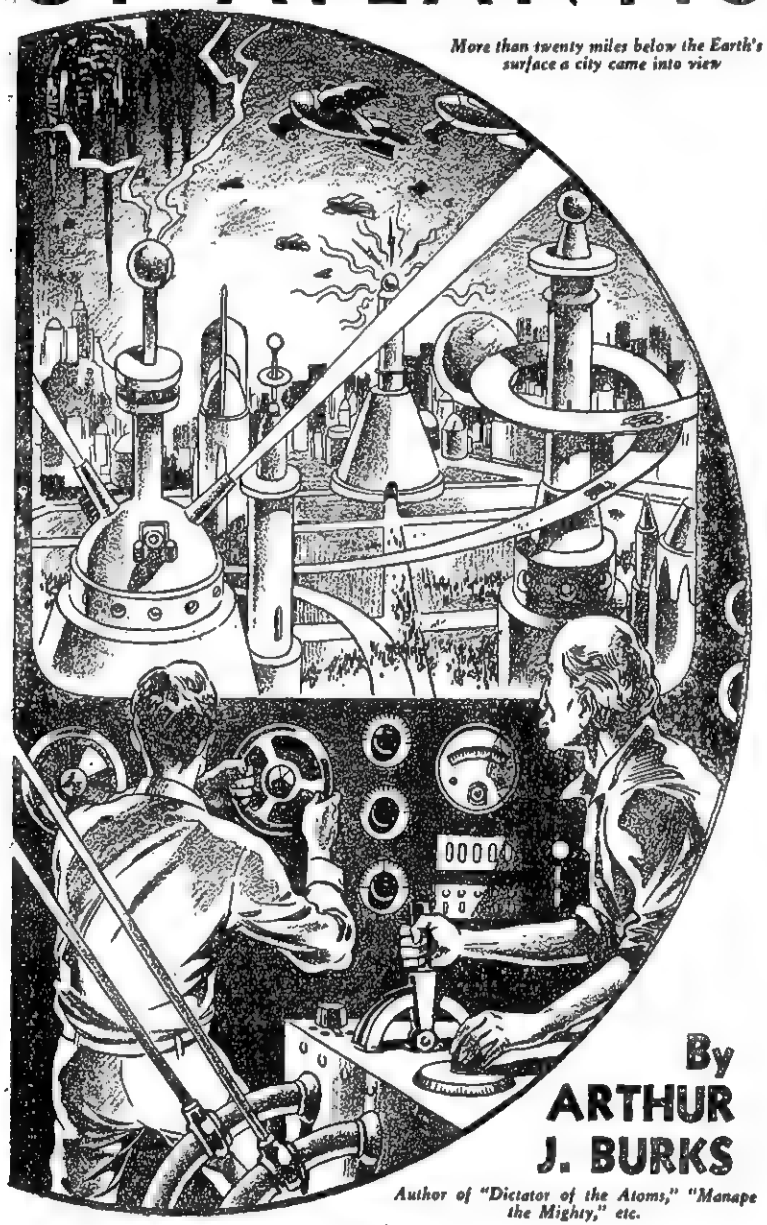

More than twenty miles below the Earth's surface a city came into view

By ARTHUR J. BURKS

Author of "Dictator of the Atoms," "Manape the Mighty," etc.

OF ATLANTIS

More than twenty miles below the Earth's surface a city came into view

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"Seems to me we've already done more than we ever hoped for. You snap a switch—twirl a few dials—and instantly you can bring to view any scene in North America on one of the screens here. Selective television, with the elimination of a transmitter! It's like being able to listen to a concert at Carnegie Hall with your radio, even though the concert were not being broadcast over the air. Who would have thought it possible?"

The scientists stood side by side, staring at the great panels which reached from the floor of the vast circular room, atop Helix, to some eight feet above it. Above the top of the panels, which were television screens, the dome began, made of fused quartz. Soon, Herndon and Fore promised, Blackie Margin would have his first telescope. They conceded that, just possibly, there might be something on other worlds worth seeing.

For a solid month Hilton Fore toiled daily far into the night, experimenting with his Televisor. Floods, fires, hold-ups, sport events—nothing escaped the all-seeing powers of the telescreens.

It was on the afternoon of July fourth that screen Seventy-Seven showed the first of the phenomena that heralded the grim Cold Doom. The three had been focusing their individual sets of screens, trying to work out field intensities that would eliminate magnetic static, when Hilton Fore whistled softly.

"Look at screen Seventy-Seven, men," said the engineer huskily, "and then look at the calendar! Screen Seventy-Seven is a section of New York City, from Washington Square to Columbus Circle, from the Hudson River to the East River. Tell me what you see!"

"Snow!" said Monty Herndon. "Snow!" he repeated simply. "And in New York City, in July, when you can, ordinarily, fry eggs on any sidewalk."

HILTON FORE stared at the screen. Then he checked the controls of Seventy-Seven, and found absolutely nothing wrong with the apparatus. It actually was snowing in New York City, in the summer. Moreover, the faces of the people on the streets were masks of fearful amazement. Obviously the snow had come without warning from the weather man. It had just simply started.

In the Televisor the snow seemed so close that all three scientists shivered involuntarily, and made gestures of pulling their collars up about their necks. But they didn't take their eyes off the people on New York's city streets. Many of those people were ducking into doorways, and some were coming back out, wearing overcoats they hadn't expected to wear for several months yet. They still wore looks of baffled, stupefied amazement.

Fore was the first to turn and study the other screens, which were set to show the principal cities and towns, rivers and lakes of the nation. Nowhere else, according to the present adjustments of the screens, was it snowing.

"Wait a minute," said Fore thoughtfully, as Monty Herndon set the dials back to New York. "If there's snow in New York in July, there may be other weather upsets around the country—and we would be the first to see it. What other places in the nation have very warm climates now?"

"Death Valley," said Herndon, "is supposed to be the hottest region in the country. Don't tell me it's snowing there!"

"That would be screen Sixty-Two. Let's look!" Fore made some rapid calculations, swung some knobs and buttons, and Death Valley appeared on the screen. The trio gave a concerted gasp. For drifting down over the ancient sea-bed, down upon the blazing sands which had taken the lives of so many pioneers and their livestock in the early days, was a blanket of falling snow! "It can't be!" said Fore. "It simply can't be snowing in Death Valley!" he repeated incredulously.

"Try Luray, Virginia," Herndon said grimly. "I spent a sweltering summer there last year."

Blackie Margin adjusted the controls of screen Forty-One, his face impassive. It was snowing, thickly, over a wide area of which Luray, Virginia, was the center!

MEET THE AUTHOR OF THIS STORY

Arthur J. Burks

ARTHUR J. BURKS, author of THE CHALLENGE OF ATLANTIS, and long popular in the field of scientific fiction, was born in Waterville, Washington, September 13, 1898. He lived in the Grand Coulee district until 1917 when he enlisted in the United States Marine Corps, and swiftly rose through the ranks to a lieutenancy. In 1919 he was sent to Washington, D. C., where he joined the Department of Commerce as a census official, retaining his service commission in the Marine Corps.

Some two years later he was ordered to duty in the Dominican Republic. Here he served as military instructor, and commandant of the Barahona Prison until the civil affairs of the area were taken over by the Dominican government.

Lieutenant Burks was then detailed to what is now Trujillo City as a member of the Brigade Intelligence and there wrote a handbook of general information on the provinces of the Republic for the use of the Marine Intelligence.

Returning to the United States in 1924 he was stationed at San Diego, California. Upon the assumption of command of the Marine Corps base there by Brigadier General Smedley D. Butler, Burks became his aide and served him until the general was ordered to China.

Early in 1928 Burks resigned his commission to devote all his time to writing and returned to America by way of Japan and the Hawaiian Islands. Since starting to free-lance he has written several books, more than a thousand magazine stories and articles, radio and motion picture scripts.

"Snow," said Hilton Fore, with a hint of terror in his voice, "in the world's richest city, in the valley that's lowest below sea-level, in a locale known for its scorching summers. Listen, fellows, wouldn't it be well, intriguing, if ."

"Well, if what?" said Blackie Margin, when Fore hesitated to continue.

"If this trick weather were being produced systematically, for a purpose, by some power of which we know nothing whatever at the moment?"

Blackie Margin whistled.

"That would," he said, "definitely distract my attention from astronomy."

Monty Herndon remained silent, turned on the radio. Over it came the excited shouting of an announcer, confirming what the trio had already seen on their screens! Snow in July, in places where there never should be snow at all, or only in the dead of winter!

"It makes me think, somehow," said Hilton Fore, "of a game of chess!"

"Funny," said Monty Herndon, in a strangled voice, "I got an impression, too. I thought of a game of checkers, being played by invisible people. And where the white spaces are—it's snowing!"

CHAPTER II

Cold Annihilation

GROWING terror gripped the continent of North America. The eerie, silent fall of snow had begun almost simultaneously in New York City, Death Valley, Luray, Yucatan, Minneapolis, New Orleans and Richmond.

Meteorologists could not explain it, for the areas had no connection whatever with one another, and the separate falls of snow were strangely isolated, causing no strange effect whatever on surrounding territory. It was almost as though great invisible cylinders had been dropped from "Outside," over the areas affected, and the snow funneled down to those areas.

For example, within a mile of Death Valley the climate was the same as it had always been, while Death Valley was being heaped with fine, silvery snow, on which the sun glistened with a brazen iridescence during the day, and the moon shone weirdly beautiful at night. New York's streets were filled so quickly that the army of shovelers put to work could not handle the job. Plows and shovels of all kinds were set to work, yet the snow fell faster than it could be removed. And the cold became increasingly intense.

"There seems to be no explanation based on previous weather information!" the meteorologists wailed. "Why have these certain areas been selected? We don't know. Nobody seems to know. Science is baffled. It has snowed steadily for seventy-two hours, and the snow increases in volume with every passing hour, as does the cold. But there is no wind, and it is as though, in every instance, the areas were locked within some invisible, vast chamber, to be drowned by the silent, falling snow."

So the terror waxed and grew, and Fore, Margin and Herndon forgot all about sleeping. Margin didn't give a thought to his beloved stars, save to wonder, right at first, if denizens from outside were not trying to experiment with the inhabitants of Earth.

It became increasingly evident that the snowfall was to continue only in the places where it first began. No other cities or localities were affected. But why those? There was no explanation, certainly no official one—until Hilton Fore, his face grim, his eyes narrowed, called together a conference of his partners.

"I am convinced that there is a purpose behind these snows," he said. "I am sure that the snowfall is being deliberately contrived. But how, and by whom or what, I don't know. And I'm sure it presages something outside and beyond the experience of any human beings in all recorded history. I intend to find the answer!"

"Just what is your theory?" Herndon asked quietly.

"Some force, contrived by man, or by creatures of intelligence greater than ours," said Fore, "is causing these snows in these particular spots, and for a purpose. For seventy-two hours, we have used our screens without tangible results. We have located no central power station from which the force might emanate that would bring this strange snowfall about. We've located nothing, except snow where there should be none. And we're not supposed to."

"Is it—from—Outside?" asked Herndon, almost afraid to ask and be answered.

Hilton Fore shook his tousled head. "No, I don't think so. Because snow, strictly speaking, is local. It doesn't come down from vast heights. It is produced at certain altitudes, above which planes may fly with ease. Planes have flown over every one of those areas of snowstorm—without any ill effects. However ."

FORE took a deep breath. Anxiously his partners watched him.

"What do we know, actually," he said, "of what there may be within the crust of the Earth, far below any depth ever reached by man? It is generally believed that the Earth originally was a molten mass, perhaps cast off by the sun. It is believed that within this mass existed all the organic elements necessary for life, or else that life migrated to this planet from other planets. What I'm getting at is this: how do we know that somewhere far down there may not be living creatures? Things, perhaps, which can survive even in the molten heat of volcanoes? Things which, for all we know, can actually walk to and fro in the Earth, and up and down in it? Let's put our heads together. What do we know, even from myths, about such potential beings?"

"Edgar Rice Burroughs and other imaginative minds have imagined such beings," said Margin, who read all sorts of literature dealing with the apparently fantastic and impossible, "but even they don't believe in 'em."

"No?" said Fore. "Yet, what of Atlantis, of Mu?"

"What are you driving at?" said Herndon, his voice very low. "The same thing I've been thinking, I'll wager!"

"Maybe. Legend says that the inhabitants of Mu, Atlantis and Lemuria were a brilliant race. They were scientific people, whose records sank under the sea with them. But did they know in some way that their world was to sink beneath the ocean? Did they prepare for it, intending to go under with their beloved lands?"

"And certain selected survivors," interrupted Blackie Margin, "went into dwellings they had already built in anticipation of the catastrophe, where their descendants survive to this day! Once their continent came to rest on the bed of the ocean, what was there to prevent the Atlantides from boring into the Earth, and there building subterranean cities? What was to prevent them from spreading out, deep in the Earth's crust, with the growth of population, down the ages?"

"And that," said Hilton Fore, "is just what I've been asking myself. And because I was somewhat skeptical, perhaps, as to how you lads would take my theory, I did some work in secret that may give us the answer. Right now, with our Televisor, we can see anywhere inside the continental limits of the United States, Canada and Mexico, south to Costa Rica. We've probed the stratosphere without getting a clue. During the past few weeks I've been trying to perfect a cosmic ray beam carrier that should have a greater spanning power than the wavelength carrier we have been using. Now, I propose to look into the Earth! And I don't mind admitting that I'm afraid of what the screens may flash to view!"

The trio was breathing hard and their eyes glowed with excitement.

"I've adapted our apparatus," said Fore, quietly, "so that now we can see into the Earth, at a given locality, for a depth of many miles. If there is anything down there, under the areas of snowfall, then we'll be able to see it. Are you ready?"

The other two straightened, gathering their courage together.

Blackie Margin nodded silently, his face tense.

"Where," said Fore, "shall we look first?"

"Let's take it by slow degrees," said Herndon. "Let's start at Death Valley, and work on to New York slowly, taking the shock, if any, a little at a time."

INSTANTLY the trio sprang to their screens. Fore became so engrossed in manipulating the new instruments he had perfected that he almost forgot the others. Death Valley, recognizable more by its geographic position, rather than by visual characteristics — because now the snowfall was so steady and thick that a mighty column of white seemed to reach from the area into the heights of the sky—came onto the screen.

"Now," said Fore, "there's the Valley. In a second I start depressing the television beam. See? That's the formation below Death Valley, a mile down. Looks to be rock of some sort, pretty solid. Here we go now, on down! That's two miles. Now, three! There, that black splotch, several times the area of the Valley, is a pool of oil that may make some people millionaires some day. Incidentally, with this gadget we can locate all the pools in the world, if and when we wish to! Below the pool, then, is. . . ."

Hilton Fore broke off, for suddenly the telescreen became blurred. Slowly the last image faded from view, remained for a split second the way some impressions linger on the retina, then completely disappeared. The screen had gone blank!

Fore fumbled with the multiple controls of the Televisor, tried again. When his beam had penetrated below the surface once more, strata and rocks were shown clearly on the screen, in sharp relief. Five miles down, six,

seven—the Televisor functioned smoothly. Then, when another mile down, as before, the screen went blank again.

"It can't be anything wrong with the Televisor," protested Herndon, puzzled. "For the machine has a penetrative power of more than twenty miles. What then can be the matter? Do you think that there is a radiation screen around the Earth miles below, similar to the Heaviside layer in our stratosphere? We know how the Heaviside layer makes it impossible for radio waves to pierce the stratosphere, and thus keeps radio waves from speeding away from the earth. Is there a sort of cousin to this phenomenon in the bowels of the Earth?"

Blackie Martin started to answer, but the sharp voice of the newscast radio announcer interrupted:

"Flash! Although the strange summer snow is continuing to fall in various parts of the nation, it has completely stopped snowing in Death Valley!"

"Death Valley!" echoed Fore. "It was snowing there—until we tried to depress our beam below its surface!" The scientist's eyes glowed strangely. "I wonder—" he said almost inaudibly to himself. But it started snowing again there before he had finished his sentence.

"Lower the power strength of your beam," suggested Herndon. "Maybe we'll see something then."

Fore nodded, manipulated various instruments on the control board. He worked swiftly, efficiently. Finally he was ready for another trial.

As he depressed his beam the telescreen began glowing once more. It flickered with a fainter light than before. But it brought results. The men gasped as the beam penetrated down, annihilating distance until it seemed that they were reaching into the very bowels of the Earth.

Then Blackie Margin cried out aloud.

"Great God Almighty!"

More than twenty miles below the earth's surface, within a vast cavern, a city came into view. A city of towers, of minarets, a city of artificial suns, great electrical devices and ultra-modern aircraft. Thousands of human beings swarmed about.

"They're just like us," said Margin, awe in his voice.

"Why not?" snapped Fore. "The peoples of the Earth are descended from the same stock! Yonder, partners, are some distant relatives of ours, and obviously they've outstripped us in matters of science. Watch what they're doing!"

THE Insiders—a name the trio gave to them by mutual consent—had discovered anti-gravity, and perfected machinery to its use. They rose and fell in the monster shaft that reached into the heights from the outskirts of their vast, majestic city, in globes that held anywhere from two to seven men, men armed with powerful-looking weapons.

Dozens of those cars were against the roof of the cavern, busy as hummingbirds about a garden of flowers, and pencils of light were playing on the roof of the cavern.

"God!" said Fore. "They're melting it away. It runs down the walls of the cavern. Somewhere down there must be a vaster cavern still, into which the stuff is sucked. Those folks are coming up, literally, for air! They're attacking the United States!"

Gasps of horror burst from Herndon and Margin as Fore switched his screen to the New York area—to make an amazing discovery, aside from the peculiar one that he and his partners had been watching the Insiders at work below Death Valley for ten hours without realizing the passage of time: New York was freezing to death! There could be no mistake. People caught outdoors were standing still, half buried in the snow, where the bitter cold had trapped them.

Fore depressed his beam, probed deeper and deeper below Manhattan. He went down for more than six miles before he reached the top of a cavern that went on down and down, almost into the core of the Earth. And there too, the Insiders were busy with their strange scientific devices.

They were literally burning the props from under the city of New York.

Sweat beaded Fore's brow as he made some rapid calculations. He turned frightened eyes on his partners then.

"They know almost exactly where to break through and avoid being flooded by the rivers surrounding New York, and the Atlantic Ocean. They can simply reach up and pull New York into the depths, leaving nothing but a vast hole, as a corer takes the core out of an apple!"

"Now," said Herndon, "I know why I thought of checkers, why you thought of chess! We three are the first to know, and we are playing, against the Insiders, the grimmest, most vital game of chess ever devised! No wonder we sensed it in advance!"

"I've got to break the news, if anybody will believe such an impossible tale," said Fore. "We must get word to Washington!"

Nine hours later a grim young officer walked into the observatory, and the trio, without a word of greeting, showed him the stories told by the screens. He looked, his face white with terror. Then he left silently.

Back in Washington, the President interviewed the young officer. "New York must be evacuated, sir," the youth said. "She is being attacked from below, by a race of human beings discovered by Hilton Fore and his fellow scientists. We must work fast, sir, for in a matter of days New York will be pulled into the bowels of the earth! The same applies to every place where the snow is falling so hideously out of season. Hurry, sir! Evacuate New York! Then, sir, surround it by army divisions—for the Insiders appear to be coming as enemies!"

So the word went forth, and within an hour panic, in spite of every precaution, filled the entire world. It was apparent that no inhabited land anywhere was safe, if the Insiders came as enemies. And that they did so come seemed proved by the unerring accuracy of their ascent to the foundations of New York City.

FOUR army divisions were marched to Death Valley, to throw a protective cordon around the area—in which, now, nothing born on the face of the Earth could live, because it had become a solidly frozen area, far below zero in temperature.

"I'd say," whispered Herndon, "that the stuff the Insiders are using is something like liquid air, or may even be ether, which penetrates everything."

"I think I know what causes the cold," Fore interrupted. "Heat is the random motion of molecules. Reducing the motion 'takes away heat.' If they had a strange force that could make the molecules vibrate in one plane, or one direction, the same result would be achieved. This force would have to be one analogous to magnetism. In fact, that has actually been done in low temperature research in various laboratories."

"You're right," broke in Margin. "They freeze an iron salt like iron alum with liquid helium. Then they whip a powerful magnetic field around this salt frozen to less than one degree absolute. The magnetic field makes the iron molecules vibrate in one plane. The heat this releases is taken up by the liquid helium and the salt becomes 'colder' than it was before."

"Correct!" Fore announced. "Apparently the Insiders have a 'magnetic' force that can make all molecules vibrate in one plane. The heat given off radiates into outer space where the beam penetrates beyond the atmosphere. This chills the air and, in turn, causes snow."

Fore made an end at that point. For just then Death Valley literally melted and ran into the bowels of the Earth!

As it vanished the snows vanished. The cold disappeared instantly, and where Death Valley had been there was now a bottomless pit—leading straight down for breath-taking miles!

And rising out of that pit were swarms of spherical aircraft filled with grim-faced, brown-skinned men!

CHAPTER III

Holocaust

HILTON FORE shook his head emphatically. "Unbelievable as it is," he said, "the answer is at least

comprehensible, when you realize that the Insiders are survivors of Atlantis. When their lands submerged they took with them records of life above ground. So they know, at least by legend, what it's like above the crust—just as some of our scientists have ideas of what it may be like to live on Mars, Venus, Neptune or Uranus. And since the Insiders know the secret of anti-gravity, they know exactly the mass of the Earth—a fact that they also took with them, in all probability, when their continents submerged. The crust of the Earth simply buckled, and the bottom of the sea became the land we live on today. The continents of Atlantis went under. That's all. Now, their inhabitants are reclaiming their own!"

"And they're superior to us in every way!" moaned Herndon.

"That remains to be seen. One thing is certain, however. This is the one place in the world from which defense can be directed. I'm going to ask the commanding general of the armies to run the defense from Mount Helix."

No sooner said than done. In eight hours, by the fastest available plane, the general of the armies entered the observatory with his staff, and immediately established radio communication with United States forces everywhere. And just in time, too. . . .

For out of what had been Death Valley hordes of fighting Insiders were erupting. Their s p h e r i c a l planes, flown by anti-gravitational force, shot into the air, and scattered immediately, to form in threatening squadrons over the four army divisions guarding the Death Valley "exit." From swiftly dug trenches and dugouts, from concrete emplacements hurriedly prepared, the most modern weapons of war were loosed at the Insiders.

But the Insiders, speeding back and forth over the heads of the doughboys and marines, were the first to draw blood. Bullets seemed to have no effect whatever on the queer planes of the Insiders. The planes were thrown all about, rocking and rolling, in the sky, but they did not fall or break apart.

And finally, from the belly of one of them, a white bomb dropped. General Marcus Lang watched the falling of that bomb with the grimmest face Fore had ever seen. The bomb struck in the midst of a battalion of doughboys.

The effect of it, when it broke apart, with a puff of what looked to be white smoke, was terrifying in the extreme.

For the entire battalion, in the space of a heartbeat, was frozen solid! Men were kneeling, aiming rifles at the speeding planes above their heads. White, thin smoke from the bomb touched this one and that one, and the men remained as the stuff had hit them—still pointing useless rifles at the sky. Fore saw other men, after half an hour or so, go among the dead, and push some of them over—and as the frozen ones fell they held the shapes of men kneeling, firing at empty space!

Lang turned a ghastly face on Hilton Fore.

"You know more about this than anyone else, Fore. Have you any ideas?"

"Just this, sir. Those people are descended from our own remote forebears. They are like us, though for millions of years—perhaps—they've lived and developed Inside. Their language is not our language. We have no way of communicating with them. We can't even proffer friendship. If we could catch a prisoner or two—"

LANG shrugged, turned back to the Televisor. Fore pointed to four screens, set side by side, which he had coordinated, as sections of a mosaic map are fitted together, to show one big picture.

"That, sir," he explained quietly, "is just one section of an Insider city, or country, or state, whatever their political subdivisions may be. What chance have we against that?"

For several minutes Lang stared at a city that was many miles below Death Valley—a city vaster than half a dozen Londons and New Yorks thrown together, a city teeming with millions of people, men, women and children, who must all know what their fighters were doing—though the Americans had not yet learned how the fighters communicated with their bases—but were as unconcerned as though

it mattered not at all.

"They haven't the slightest doubt of the outcome, sir. There is no war terror there, sir."

But Lang was not listening. He studied the vast cavern of the Insiders, which housed the monster city He studied the faces of inhabitants. He studied the labyrinth of tunnels, of levels and sublevels. He whistled softly as he watched tiny worms, speeding along tunnels, connecting cities with other cities, and knew that he was looking at an Insider "railway system" far more efficient than any on the surface. And why not? The Insiders had never been decimated, by any intermittent scourge of war.

"Catacombs beyond conception," whispered Lang. "Millions and millions of fighting men. Infinite sources of supply, built up and hoarded through the ages! That's what we're fighting and no way to come to any agreement."

"How do we know, sir?" said Hilton Fore, softly.

Lang whirled on him, eyes narrowed.

"Fore," he said, "if you hadn't discovered this business, we'd have been taken unawares, and would have lost this crazy war before we even got ready to start. So now you have a job, while I'm trying to get prisoners. Find a way to communicate with these people you call the Insiders! Remember, as you work it out, that every hour of delay means the loss of thousands of lives!"

Fore hesitated, feeling as though all the responsibilities of the world rested on the shoulders of himself and his partners. He looked out at Death Valley Pit in time to see half a dozen great bombers fly low over it, and begin to drop their bombs.

But only one or two bombs were dropped. Something happened to the bombers themselves. They hovered, hesitated in mid-air. Then every last one of them nosed down, or suddenly side-slipped, and went plummetting into the depths!

Fore depressed a beam of a screen to watch the bombers strike the bottom of the ghastly pit with their loads of bombs. . .

And he saw them settle as lightly on the bottom of the vast cavern as feathers! Not a bomb exploded.

Insiders charged the bombers from the nearest city. American fliers were dragged, looking like men stunned, acting like men trying to run in deep water, out of the bombers.

Uncle Sam had collected no prisoners as yet—but the Insiders had collected bombers as well as prisoners!

Fore suddenly had an inspiration. He whirled on Lang.

"Sir, talk to those bomber pilots and crew by radio, immediately! They fell into the pit, sir, landing unhurt, apparently lowered on a cushion of air! Talk to them, by word of mouth!"

Lang instantly obeyed the suggestion. His voice sped out and down to the prisoners.

"You bomber pilots! Keep your captors near your planes if you possibly can. We must somehow establish understandable communication with the Insiders. This is the only way. Lang speaking! Let the senior officer present answer me!"

FORE was watching the crowd of Insiders about the fallen planes. They stood as men turned to stone. He could imagine what it must have seemed like to them, if it were as far outside their experience as were the armaments of the Insiders to Americans, to hear human voices issue from empty, captured planes.

The fliers did their job. They motioned the Insiders to step closer, to listen. Fore saw forced smiles on the faces of the fliers, to whom the depths must have been unbelievable torture, as they tried to make the Insiders believe they wished to be friends.

Meanwhile, the Insiders who had broken through on the North American continent were winging hell-bent toward the biggest surface cities—and Fore knew that in the bodies of their spherical ships they carried death and destruction for all who opposed them.

But one thing was gained. Lang was talking to his bombers who had dropped into the pit. Insiders down there were listening, trying to understand.

"They're bound to understand maps, Carstrom," said Lang, evidently to the senior officer present among the prisoners. "See if you can tell them, by signs, that we desire peace. Then, when you've made them understand, draw a map—as accurate a one as you can manage—showing Mount Helix. They'll know how to communicate with their troops on the surface. Try, somehow, to get word to their senior officer up here, offering him safe conduct to and from the Fore Observatory on Mount Helix."

Lang turned to Fore. Fore, nodding approval, stepped to the screen showing the progress of the Insiders below New York City.

"New York," said Fore, "will be plucked into the depths within seventy-two hours! We've got to work at top speed, sir!"

Lang did not hear him. The general was concentrating on the efforts of Carstrom to make himself understood by the Insiders below Death Valley.

Fore looked over Lang's shoulder. Almost close enough to touch, they saw Carstrom, seated, carefully drawing a map—while, crowded around him, were a group of Insiders.

After a full minute Carstrom raised his head, looked about him.

"It's no use, General Lang," he cried. "They can't understand! The Insiders are—blind!"

CHAPTER IV

Truce

THE tall scientist whirled on Lang.

"We might have known," he said hoarsely. "Living for centuries in a sunless world, they have lost their sense of sight. They probably have acute hearing apparatus that enables them to interpret any waves radiating through the ground." He paused for a moment. "But what of their artificial suns? What are they for? It doesn't make sense!"

The general pointed to a giant of a man in a corner of the screen. He was wearing something on his head that looked like a speculum. Fore watched him with a puzzled frown. Presently the tall man approached Carstrom, attached a metal device to his head. The two men stared at each other, and Fore saw Carstrom's face brighten with understanding.

Simultaneously the watching men realized that the Insiders were trying to communicate with Carstrom through the medium of a thought machine.

Fascinated, they watched the silent, awesome communication between Carstrom and the giant Insider. Then the latter whirled and sped into the city, vanishing into what looked like a small cathedral. Lang and Fore exchanged glances. Margin and Herndon, close by, whistled softly.

Then, by common consent, they looked at the fight about Death Valley Pit. The spherical planes of the enemy were refusing combat. They were all hurtling at top speed back to the pit, and diving into it like owls into badger holes!

"Thank God, sir!" said Fore. "We've lost plenty of men, but we'd have lost everything if we hadn't taken advantage of the breaks and got into communication with the Insiders."

Now he whirled to screen Seventy-Seven, and almost sobbed with relief. The Insiders, as by some word of command from somewhere, had ceased work on the pit destined to engulf New York City.

The undermining work of the Insiders, at Luray, Richmond, New Orleans—everywhere they had so far been spotted—stopped abruptly at the same identical moment. The Armistice had been brought to pass.

Lang began to search the sky toward Death Valley.

"Well, Fore, I guess you knew your stuff, all right. Here come three of the planes. Their battle commander, I suppose, and his staff, or maybe his bodyguard. Let's go out on the terrace to receive them!"

In less than an hour three spherical planes were dropping swiftly down to the terrace before the doors of Mount Helix's Observatory.

The planes landed. Doors opened silently. Out of the first stepped a square-shouldered, swarthy man with a black beard. The man, Fore judged, was all of six feet six inches in height, and must have weighed around two hundred and fifty pounds, without an ounce of fat on him.

HIS clothing was almost skin-tight. It reminded Fore of some surrealist's dream of the clothing of tomorrow for surface folk. The man staggered a bit, as though he were not sure of himself on the surface, as though the atmosphere were difficult for him. Then he walked steadily forward, his black eyes darting from face to face of the little group.

He settled unerringly on Hilton Fore as the spokesman.

"Good judgment, Fore," whispered Lang. "After all, you *are* the one who has pulled all the strings in this business. But how did he know?"

"How," said Fore, "am I going to ask him?"

The Insider officer answered his question. He draped one of the headsets over Fore, attached a similar one over his own head. Fore knew instantly, without the necessity of words, that he was "hearing" the thoughts of the Insider!

For what seemed to Lang like an interminable time, the two men stood rooted to the floor, their minds occupied by intense concentration. An eternity later Fore tore off his headset, sank down into a chair.

"It's an incredible story, General," he said finally. "I myself am to blame for the invasion of the Insiders!"

General Lang's eyes widened.

"I'll explain," went on Fore. "For long ages the Insiders have been living under Earth's crust, in huge natural gas-pockets. The natural caves forming their cities offered poor protection against the shifting of the Earth's strata. They intended to bore out into the world outside, live here. To force their way through the miles of rock and land, the Insiders made use of a new kind of d i s i n t e g r a t i n g ray. Though they were unaware of it at the time, these rays, reaching out into our stratosphere, brought about our cold weather and snows.

"When we probed with our Televisor, using a strong cosmic ray beam carrier, our super-waves had the effect of destroying the function of their artificial suns. They cannot see by ordinary light; it is too strong for their eyes. Their artificial suns were their only source of illumination. Strange to say, the Insiders thought *we* were warring on *them*. So they renewed their efforts to tunnel into our land—with more snow resulting for us!"

Fore paused for a moment as Herndon and Margin stood still, petrified with amazement.

"We should have guessed it," Herndon said at last. "Remember how it stopped snowing momentarily in Death Valley the first time we looked below?"

FORE nodded, then went on.

"Aggar here says that men have been killed on both sides. He suggests that we mutually indemnify each other for our dead. He is happy that no further destruction was necessary, and feels, for his country, that a friendly agreement is possible—also that both of us are fortunate that an agreement could be reached with so little bloodshed, when there might have been so horribly much."

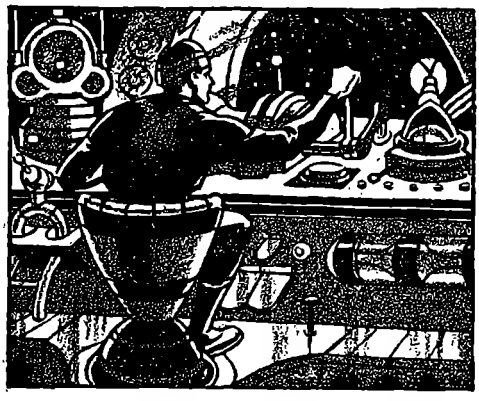
"God," said Lang, "sight-seeing trains to the Inside! Exchange of science. Diplomatic relations! New impetus to trade throughout the world. The answer to their economic problems may be the answer to ours. Vast domes built over the exits—those domes to be the terminals of the subcontinental trains, or elevators, or planes, whatever we may decide on. Fore, a new era has been ushered in. Now, I'm wondering about something. I'm almost afraid to ask. What is the name of his country?"

"The name of his country, as nearly as I could get it, sir," he said, "is Leatmu! I can't believe it, but an amalgamation of the survivors of Mu, Atlantis and Lemuria might cause the coining of such a name for a vast confederation."

"Who will believe it?" whispered Lang.

"Everybody," said Fore, "when business, commerce, and exchange of visits between the countries of the surface and Leatmu begin—which will be very soon. A new era of mankind has dawned. Incidentally, it makes war among us surface people seem useless and silly, doesn't it? War really never settled anything."

And Aggar smiled knowingly, even though he could not understand what Fore was saying.



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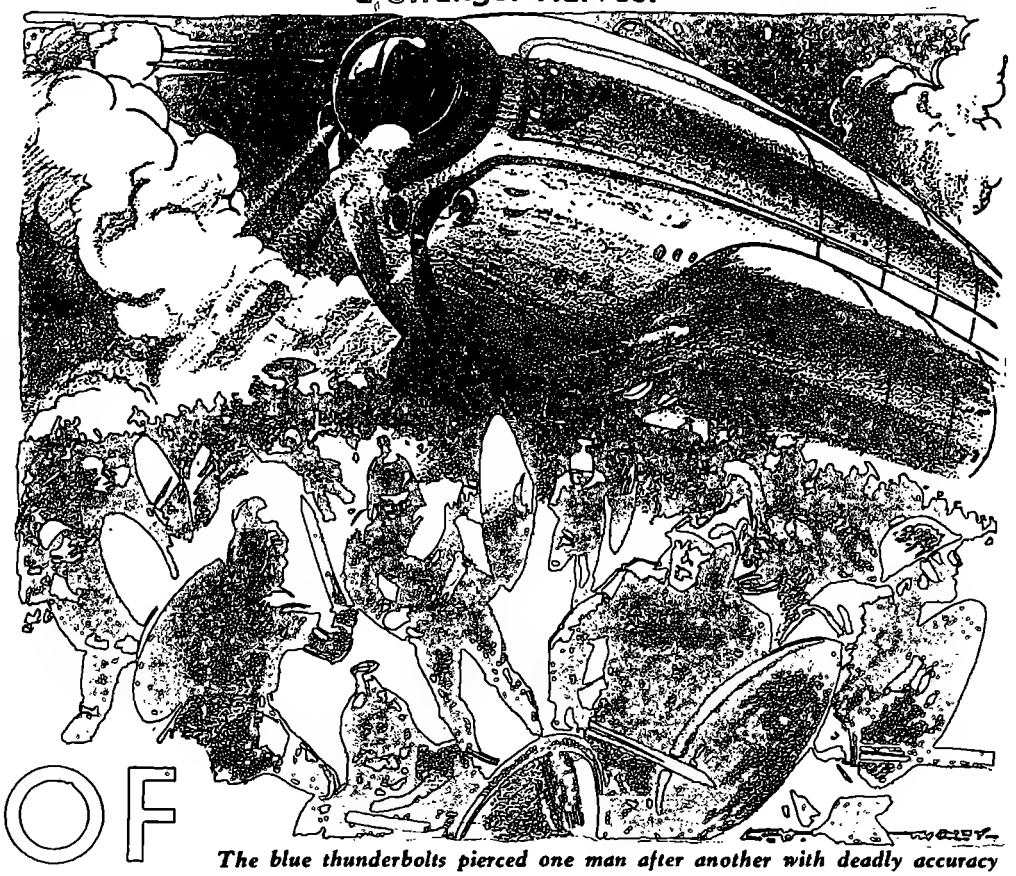


The blue thunderbolts pierced one man after another with deadly accuracy

OF JOVIAN BUILD

By OSCAR J. FRIEND

Author of "Tibetan Horror," "The Mississippi Hawk," etc.

I

The Dragon of Cadmus

THE metal space ship, fallen to earth, was nested in a grove of trees. A thing of shimmering, golden scales about one hundred feet long, shaped somewhat like a blunted javelin, the craft looked like a beautiful, full-grown dragon to the men who had come upon it.

At first, the warriors were frightened. Then, as the strange thing gave no indication of life, their awe turned to curiosity. They ventured closer, gripping their spears and javelins nervously. The ship they thought was a dragon did not stir. At last one of the party drew near enough to touch the serpent experimentally with the point of the spear. The thing rang with a brazen sound. But still it stirred not.

Then it was that one, bolder than the rest, found odd steps, like horizontal gills, which led up the curving head to a level area. There was a glass aper-

ture, like a bulging eye. Soon a dozen men were swarming about the head and staring into the eye. The window presented a most unusual picture. Through it the observer saw a man with large ears who sat in a curved armchair. He faced a metal wall studded with strange dials and knobs.

"Ho, Perexites," shouted one warrior as he pried with his short sword at a crevice at the base of the hemispherical eye, "methinks 'tis like Talus—another creation of Hephaestus. It is a dragon of metal."

"Have a care then that it doesn't wax hot and burn thy feet," laughed Perexites.

Others of the group clambered along the back of the strange creature while more than a few circled it on the ground, climbing over the felled trees crushed by the ship. Suddenly, the thing came to horrible and terrifying life. The picture of the man with the large ears moved. Wearily, slowly, like a tired man moving under water, the figure reached out one hand and pressed a series of the little buttons on the wall.

Shafts of flame leaped forth from an opening just below the globular eye, like a triple tongue. From the tip of one of the three forks issued a column of green vapor. Another stabbed forth bluish thunderbolts, and from the third fork flowed a pencil of reddish light. The great eye began to revolve upon that rounded head with a vibratory hum.

Death rays struck one man after another with deadly accuracy. The men toppled to the ground, lifeless. Those that escaped the blue death rays were enveloped by the lethal green gas. Others, caught by the red shaft of light, simply were disintegrated.

Soon all the men about the globular eye were dead or utterly annihilated. The metallic dragon was alone in the midst of the carnage it had wrought with poison gas, death ray, and electronic thunderbolt.

IT was thus that Cadmus, founder of Thebes, discovered matters when he came in search of his followers. Brave beyond the usual courage of men, he drew his sword and charged forward to avenge the death of his followers, or die with them. He clambered up the side of the space ship, reached the window that seemed like a great eye.

Then the Greek halted in amazement. For inside the transparent eye of the metal dragon he saw a man imprisoned. Attacking the quartz window fearlessly, Cadmus was dismayed to have his weapon spring back from the blow he struck. Before he could strike again, the man within moved a finger and pressed against a projection of some sort within the spherical dome. A section of the dome split open, making a passageway into the interior.

Cadmus shortened his sword grip for a thrust into the vitals of any foe and strode forward. Within the dome, he knelt swiftly beside the imprisoned man who was breathing stertorously, his head now resting on his arm. Then Cadmus met with the greatest surprise of his life. Warm with life, this queer and suffering stranger had flesh as hard as bronze. When Cadmus attempted to roll him over onto his back, he found himself unable to budge the man.

He prepared to grip the heavily breathing stranger with both hands. And at this moment a voice spoke in his brain, and he was aware of a definite thought implanted in his mind.

"You cannot move me, my friend, for I weigh nearly three hundred and twenty times more than you think. The artificial gravitational field was put out of service in the crash. It was with the greatest effort that I manipulated the keys of the ray tubes and the conning turret. I am sorry to have killed your companions. I did so before I caught their simple thought waves."

At this calm admission Cadmus drew back and gripped his sword again, his face growing stern. The unknown man who was able to give his thoughts birth in the listener's brain managed to roll himself half over on his side, and he stared at the Greek warrior with agonized eyes.

"Your weapon, I know now, will avail you naught, since I understand its use from reading your mind. The pres-

ent density of my mass is impenetrable to any weapon known to your kind. But since you desire my death so fiercely, know that I am dying—internally crushed by the shock of landing on your planet. I admitted you so you can heed and obey my message.

"I am Mentor 5X9378, sole navigator of the spatial vessel *Marduk*, leader of the expedition to explore the third planet of this System. My companions, because of the length of time required to make this journey, are each in a special casket in the main compartment below us in a state of suspended animation. They were thus cushioned and protected from the crash which has been the cause of my death. Once awake and free, they will be able to repair the gravitational field and proceed with the purpose of this expedition.

"You are wondering why I seem so heavy to you. The world I come from has a surface gravity two and one-half times that of this planet. Our astronomers made the astounding discovery that this planet is a carefully scaled miniature of ours. Hence, if we were to explore it successfully, we would have to be reduced in size.

"Savant 2X1470, using his atom and mass impactor, reduced us to one-hundred-and-one-sixteenth our normal size. Thus, the cellular structure of my entire body has been condensed until I am nearer a true solid than any other body you have ever seen."

Cadmus stared in bewilderment.

"I see you follow my statements with difficulty, and my time grows short. Push this lever to the forward end of its slot. That opens the way to the storage deck below. Then shove that second and third lever and twist the wheel there as far as it will go to the right. That opens the ports on the storage level to light and air."

CADMUS reached out and manipulated the proper levers and twisted the shining and spoked wheel. He was conscious at once of a vibratory hum somewhere below him. A section of the floor of the dome moved downward out of sight, revealing a flight of metal steps. Urged by the dying man, Cadmus slowly descended the stairs. At the bottom of the stairs, a strange sight met his eyes. There were polished caskets of gray metal lining the interior of this metal dragon like gigantic teeth in the belly of a whale.

Cadmus became conscious of the ghost voice flooding his brain with an explanation. Each tooth encased a slumbering man like the stranger beneath the dome of the huge glass eye. A tiny seam traced a symmetrical oval upon the face of each tooth from top to bottom. On the face of this panel was a lever and a tiny wheel.

In obedience to the summons within his brain, Cadmus halted before the first great casket, twisted the lever, spun the tiny wheel, and stood back to observe results.

The door of the casket opened outward, slowly but smoothly. Within the padded interior was a man with big ears like the dying man above. On his breast was a single drop on bright red blood where a fang had pricked him deeply. A glance at the inner side of the panel showed Cadmus the cause of the phenomenon.

"You observe the method of revival," the thought explained itself in his mind. "Hasten and open the other caskets!"

But Cadmus did not stir for a moment, because the sleeper did. The man quivered, stirred, began breathing in a stertorous sound like the man above. Then he opened his eyes and gazed blankly. Slowly, heavily, he moved his arms up from his sides to his face. Cadmus was on the verge of offering a helping hand when the voice in his brain deterred him.

"You cannot help him. Go quickly and open the remaining receptacles!"

Impelled by this urge, Cadmus zigzagged his way along the huge chamber, manipulating levers and wheels as he went. At the far end of this storage deck was a casket that looked like a double tooth. It was just as he reached this last casket that he heard a heavy noise behind him. He whirled about and stared. The first man had fallen headlong out of his shell.

As the Greek warrior watched, others began to follow suit. And then

the crowning horror dawned on him. The first man he had released, and who was gasping his last, was no longer four cubits in height. *He was nearly eight cubits tall!* In less than an hour, he had doubled his stature. The others had grown also in proportion to the length of time they had been out of their chrysalis.

With a fearful cry, Cadmus raced madly for the stairs to the eye above. He found the first man grown to a full ten cubits! Thinking the creature was dead, Cadmus leaped over the gigantic form and plunged headlong through the open section of the dragon eye. Even as he fled, he was conscious of a last faint mental message.

"The composition of the atmosphere of the third planet has proven fatal. Due to unforeseen contingencies, our expedition has proven a failure, and there is none to report to the savants. There remains only annihilation."

But Cadmus did not remain to watch that heavy hand drop in a final effort upon a dial that was oddly different from the others on the wall. He was far out of the grove when the terrific explosion came—a blast that shook the earth and knocked him senseless upon the plain of Panope.

When he later came to examine the ruins, there was nothing left of his own companions, the dragon, or of the heavy men from another world—save a memory.

II

The Hellenic Chrysalis

IT was in 1981 that Dr. John Graham, archeologist, discovered the thing. His expedition was exploring the subsoil of the north Mediterranean littoral that had once been ancient Greece. The eminent scientist himself was manipulating the Fore Televisor* when the queerly shaped object came into focus.

"Teague! Oh, Teague!" Dr. Graham called to his technical engineer and general assistant.

"Yes, Doctor," answered the young man, hastening forward at the sound of the excitement in the other's voice. "What's wrong?"

"Have a look at this," said Graham, his voice trembling as he motioned toward the eye-pieces of special quartz. "I have the dials set at one hundred and three feet, and unless the ray has gone crazy, I've discovered a metallic object that's fully eight feet long, and nearly as wide. I can't believe it. There's no evidence that the ancient Greeks worked with metals on that scale."

Larry Teague glanced quickly at the adjustments on the Fore Televisor and then fitted his face to the hoodlike eye-pieces. At once he became fully as excited as his superior.

"You're right, Dr. Graham!" he exclaimed without removing his eyes from the hood. "It's a double object of some kind. It looks like—like the old twin elk's tooth charm my grandfather wore. What do you think it is? What shall we do?"

"We'll excavate at once," decided Graham promptly. "This is distinctly a find of the first magnitude."

It took three weeks to get down to the object. From its resting place beneath the accumulation of centuries of erosion and disintegrating rock shot with myriad flecks of an unknown silvery metal the odd find was exhumed and returned to the light of day. A casual examination revealed that the gray metal was smooth and unaffected by its years underground. It was artificially made, and the metal was unlike any ever found before on Earth.

"Unquestionably from a meteorite," decided Dr. Graham, and Teague concurred. "This thing came here from space, I'm quite positive. And do you notice the odd shape, Teague? It's like a double casket with the same base, a sort of mausoleum for a man and a woman."

"The old scientific theory of the coming of Adam and Eve, eh?" remarked the young man. Then he shrugged his shoulders. "Silly talk, of course. The only way to learn about the thing is to

* See THE CHALLENGE OF ATLANTIS, by Arthur J. Burks, in this issue.

examine it carefully. I'll have it out of this hole in a jiffy."

They went back to the surface, but Teague did not have the cryptlike container out in a jiffy. After breaking three winches and two steel cables without budging the thing, Teague finally solved the problem by descending with a small Morris-Hayden degravitator which he attached to the base of the object with cables. After turning on the current, the nullification of gravity made it absurdly easy to lift the peculiarly heavy thing out of the bottom of the shaft they had sunk to reach it.

Closer examination showed that an oval line, a lever, and an oddly figured dial were in and on the face of each half of the casket. Dr. Graham's comment about a casket took the popular fancy. Some unknown reporter promptly named the find the Hellenic Chrysalis, and the name stuck.

The first thing Dr. Graham did was to compute the weight of the chrysalis. The answer was stunning. The Hellenic Chrysalis weighed nearly one hundred tons! Leaving the degravitator attached, Graham promptly abandoned the expedition and towed the chrysalis back to his New York laboratory in the wake of his air liner.

BACK in the laboratory, leaving the degravitator on the chrysalis because of the thing's tremendous weight, the two scientists resolutely shut out the world and proceeded to exhaust every known test on the crypt. At last they found themselves no wiser than at the outset. So they decided to chance disaster and attempt to open one-half of the double casket.

Having pored in vain over the odd configurations of the circular dial, Dr. Graham found that it moved only in a clockwise direction, and he recklessly turned it as far as it would go. Then, as nothing happened, he twisted the lever. And both men stood back and trembled a little as they awaited they knew not what.

There was a vibratory hum within the lid. In due time the cover swung ponderously open to reveal the figure of a man in a state of perfect preservation. He was clad in the short skirt, helmet, greaves and sandals of an ancient Greek warrior. In one hand was a jewel-headed scepter.

"A Greek soldier!" cried out Teague in amazement. "Perfectly embalmed."

"Look!" said Graham, pointing with a trembling finger to the man's breast where a single drop of red blood glistened moistly. "Listen! He is breathing. He's alive, Teague! Great God, he lives!"

"Suspended animation!" whispered the younger man disbelievingly. "But, Doctor, the ancient Greeks knew nothing of that theory."

"He isn't a Greek, Teague," said Graham, his voice hoarse.

"What is he, then?"

"I don't know," said the scientist slowly. "But I intend finding out. Look at his exceptionally large ears. The costume is not quite right for Grecian identification. And the idea of suspended animation! Teague, I'm positive this is not an Earthman. Can't you feel his strangness? Don't you sense an alien atmosphere about him?"

Before the young assistant could reply, the man in the chrysalis opened his eyes and stared blankly at them. His breathing gradually grew louder and more stertorous, but his lungs seemed to lift and lower his chest quite easily. Then quick intelligence came into his face, and he gripped his queer rod, felt of himself, and shifted in his casket. He opened his mouth and spoke in a terrifically heavy voice which seemed to penetrate his listeners like a rasp. But the words were incomprehensible.

Dr. Graham, encouraged by the highly intelligent look on the man's face, addressed him in one language after another. All to no avail. No answering spark of understanding kindled in the casket man's eyes. He frowned in concentration as he wondered where this strange being could have come from—and to his great astonishment an answer to this unspoken question formed thought images within his brain.

He stared with wide, startled eyes at Teague, and saw that his assistant was experiencing the same sort of shock. There could be but one answer. This

strange being was communicating with them in thought images without the use of the media of speech.

"True, I am not of this planet," was the substance of the thought which seemed to be born within their brains. "I come from the fifth planet in this System—if this is the planet we set out to explore. Where is Mentor 5X9378? Where is the *Marduk?* Where are my companions?"

The two Americans looked at each other.

"Jupiter!" murmured Graham in awe. "Teague, he came from *Jupiter!*"

"Yes," the thought wave rolled through their brains. "The fifth planet is my world. But where are my comrades?"

DR. GRAHAM concentrated on a thought response.

"You were alone when we found you buried under a hundred feet of soil. You must have been there in a state of suspended animation for at least five thousand years! How did you come here from Jupiter?"

"Five thousand of your years?" groaned the man from the chrysalis. "Then all is lost. It has been nearly five hundred of our Mardukian years. Marduk has passed safely through the poison gas belt by now or has perished. But Mentor 5X9378 would never have abandoned me. Some catastrophe must have overtaken him. He destroyed the *Marduk*, or was forced to flee after unloading all the sleepers. But where are they?"

"Try to think!" urged Graham mentally. "We are your friends—Graham and Teague. We want to help you, but you must help us. What is your name? Tell us what you can!"

A faint smile of understanding lit up the features of the being in the casket. He lightly raised one hand and pointed to the drop of blood drying on his chest and then to the mechanism fitted to the under side of the casket-lid.

"An injection was made into my heart muscle and stimulating gas was forced in and out of my lungs when you opened this casket. There were fifty of us brought to your world in this state. Only Mentor 5X9378 was left conscious to direct the *Marduk*, our spatial ship which was named after our planet. When the savants discovered that Marduk was due to pass through a poison gas belt that would miss the inferior planets, the savants began planning a wholesale migration sunward. Three expeditions were sent out first. Ours was one of them. We had less than two hundred years to prepare.

"Our astronomers had learned that this planet, queerly enough, was almost a scaled miniature of Marduk, with animal life and flora quite similar to ours and in same proportion to this planet as we are to Marduk. But Marduk has one hundred and sixteen times the surface area of planet three. A company of men, each a hundred and sixteen times the height of you, would overrun this planet. So we were reduced in size to be comparable to your world. The last I remember was the sleep-inducing injection given me on Marduk just before being subjected to the impactor and then being placed and sealed in my crypt here."

Quite interested in his own thoughts, the strange being gripped the edge of his casket and stepped easily out upon the laboratory floor. As he passed beyond the nullifying effect of the Morris-Hayden degravitator an amazing thing happened. He fell heavily to his hands and knees with a force that shook the sturdily constructed building. The flooring buckled and splintered beneath his hands. In one place his foot went through. He strained every muscle to keep from being crushed to the floor, his breathing was horribly labored.

"Merciful heavens!" ejaculated Dr. Graham, instantly realizing what had happened. "They reduced their volume but not their mass. This man still has his normal Jovian weight—close to thirty tons, I should judge—and he's only six feet tall to carry that tremendous tonnage. There's not enough bearing surface to his hands and feet; his muscles have not adequate leverage to lift such a load."

"He should weigh only forty percent of his Jovian weight on Earth," commented Teague. "The gravity of Jupiter is two and a half times that of Earth."

"You mean he should be conscious of only forty percent; the actual weight is the same," corrected Graham. "But his tremendous reduction in size sets his muscular strength at naught. Help me get him back to his casket—the degravitator nullifies Earth's effects on him."

IN unison they grasped the arms of the man from Jupiter to assist him to his feet. It was like gripping warm iron that was rigid to their touch, but which kneaded slowly with a life of its own. And they were unable to budge him. Teague turned to the chrysalis which, thanks to the purring degravitator, was practically weightless. Quickly he pushed it out into the floor beside the fallen man.

"Help us!" he concentrated. "Get back into your casket where your weight is nullified."

The Jovian understood. Painfully he gripped the rim of his mausoleum with one clutching hand. Dragging himself slowly into the sheltering protection of the casket, the change in his control of his muscles was marked. His breathing became easier, and he pulled himself upright to stand comfortably at ease. But something frightful had happened.

He no longer fitted in the chrysalis! His head and shoulders were outside the casket! He was growing at the rate of an inch a minute—and the rate was visibly accelerating.

"My God!" cried Teague in alarm. "What's happened?"

"Somehow the change in gravity, coupled with something, must have counteracted the force that reduced him in size," said Graham, reflecting deeply on this alarming circumstance. "Possibly the state of suspended animation for thousands of years—"

"Main gas in your atmosphere," the thought of the Jovian impinged on his consciousness. "You call it—ni-troo-jene? The savants knew of its presence. Not particularly poisonous to me. Marduk has it, too. But with impacted cellular structure and gravity of this planet, it seems to boil my blood. I am returning to my own size."

"What shall we do, Dr. Graham?" exclaimed Teague, anxiously eyeing the visibly increasing giant and surveying the size of the laboratory. "He'll be crowded here in less than ten minutes at this rate. Can't we stop him?"

"Impossible! We haven't had time enough even to learn his name. We've got to get him out of here, or he'll be crushed to death and destroy the building, too."

"A new Alice in Wonderland," said Teague, laughing hysterically.

"Snap out of that!" said Graham sharply. "Ring for the freight elevator, and let's get him out in the open before it's too late."

The young assistant recovered himself and did as bid. In frantic haste they pushed the Hellenic Chrysalis to the lift. Too late! The case would have made it nicely, but the Jovian so far overflowed its confines that he could not get into the cage. Dr. Graham considered things despairingly.

The laboratory was about a hundred feet long and on the fifth floor or top floor of a loft building.

"Get an ax!" he cried. "We've got to enlarge a window and let him go down the fire escape."

"Will it hold his weight?" demanded Teague.

"He'll have to chance it. It's better than expanding in here."

Madly they shoved the chrysalis back through the laboratory and to the windows overlooking the alley. By this time the Jovian was nearly twenty feet tall. They could have crammed him in the elevator without the mausoleum if they had been strong enough to handle him. But he would likely have died from the unbearable weight of gravity before he reached his proper size.

THE giant sprawled quietly on his casket and watched their actions with grave eyes. Suddenly understanding their intentions, he waved them back from the row of windows. Raising his scepterlike rod that he had never released from his hand, he aimed it at the wall of the building and pressed a stud at the rear of the queer metal tube. At once a reddish glow leaped out from the end to play on the row of win-

dows. Before their eyes the glass and stone and metal melted away like so much snow beneath a tropic sun. In a moment there was only open space where there had been substantial wall.

"Did you see that?" whispered Dr. Graham. "A disintegrating ray! We must save this man at all costs. We can learn so much from him."

The Jovian, still growing at an alarming rate, shut off his ray and smiled at the two little men.

"I—I grow faint with vertigo," his thought informed them, "but my strength seems to be returning in ratio to my return to my normal size. I shall be all right as soon as I can stand."

"My God, Doctor!" groaned Larry Teague, moving out of the way of one of the Jovian's expanding legs. "He'll be wrecking the laboratory in another minute. Where can we hide him?"

"*How* can we hide him?" returned the worried scientist. "How can we feed him?"

There was no time for further speculation. The Jovian had reached the limit of the confines of the huge laboratory. Various paraphernalia and equipment around the walls began to shatter, break, or overturn as he crowded them. The two scientists were crouching in a corner near the window area now. Dr. Graham concentrated on a message to the one-hundred-foot giant.

"Have you strength enough to get out through the opening you made?" he demanded.

For answer the Jovian pointed his wand upward toward the roof and snapped on the red ray. Before their eyes the roof melted away, leaving them under the blue vault of sky with a brightly shining sun. The giant sat up, shading his eyes from the glare of the sun.

He was nearly two hundred feet tall by now.

"We make artificial sunlight on Marduk," he explained.

He didn't take time to think anything else. He was staring about in wonder at the great city unfolded about him. The two men, lost below him in the shadow of one foot, heard the gradual rise of wild pandemonium as the populace of the city became aware of the Gulliver who was rising from their midst.

Panic reigned in a moment. Fire whistles began to scream, and the shouts of frenzied people grew like the howling of demons in a bad dream.

There were car wrecks and tie-ups of traffic. People lost their lives in the wild stampedes. A few hardy souls stood in office building windows and stared in amazement or disbelief at the growing giant of a man. And the Jovian slowly got to his feet, moving carefully so as not to crush the building beneath him.

New York went mad.

It was like a disturbed anthill. And when the Jovian stepped down to street level, crushing in a couple of delivery trucks with his heavily sandaled foot, a flying squadron of police came onto the scene and began firing at the feet and lower limbs of the giant. The shots must have stung him, for he jumped away angrily, making a havoc of the street and the buildings on both sides for the length of a block.

He was now over five hundred feet tall.

Alarmed and bewildered by the din around him, completely out of touch with the only two men he knew, still expanding as he grew to his full height of seven hundred feet, the Jovian was panic-stricken.

Then the municipal government ordered down all commercial aircraft and sent up a fleet of armed fliers with four-inch guns. The result was horrible.

The black fighting planes with the domed turrets and flaming guns swarmed around the giant's head and shoulders. Wounded in several places by these things, the Jovian swatted a number of them out of existence with his huge hand as a simple matter of self-protection. From the roof garden atop one of the buildings he swooped up a handful of people to hold them close to his head while he attempted to send out thought impulses asking them to stop the attack on him.

A SUDDEN blow in his shoulder where a four-inch shell struck home made him jerk convulsively and

tighten his hand involuntarily. He crushed the handful of people like insects. Then the giant started running toward the open water that was the Upper Bay. Every step he took spelled disaster and ruin and death for New York. He toppled over the Woolworth Building with his shoulder as he passed. He staggered, wrecking the other side of the street before he could recover.

At last he was free. He sank a couple of freighters and one ferry as he plunged into the ocean and caused a tidal wave to sweep over Staten Island as he waded breast-high out to sea.

And all the time, back at his wrecked laboratory, Dr. John Graham was trying to get in touch with the authorities by telephone to explain matters and have the senseless attack on the Jovian stopped.

All to no avail. The eastern seacoast was in an uproar within twenty-four hours. Dr. John Graham and his assistant were summarily jailed until such time as their share in this catastrophe could be investigated. The Atlantic fleet was just steaming northward to put in at New York. The president of the United States ordered the fleet to drive north and east until it found the terrible giant and destroyed him.

This was done. The Jovian was found in a semi-exhausted condition swimming eastward, bleeding copiously from a bad wound in the shoulder. The super-dreadnoughts opened up on the target with big guns, torpedoes, and depth bombs. The result was inevitable.

Having lost his ponderous density of mass by a return to his proper height, the Jovian fell an easy prey to the weapons of the Lilliputian world which warred upon him without parley. He died in the North Atlantic ocean, friendless, alone, and bewildered—millions of miles away from his own world, and thousands of years away from his own time—sinking ingloriously to the bottom of the ocean to feed the deep sea fishes of an inferior planet.

IT was some days later that Dr. Graham was released from custody—far too late for anything save explanations, as is the engaging and ingenious custom of mankind. His trial, unique in a long history of unique trials, excited world comment. He was finally absolved from blame of the tragedy, and the press of the world poured contumely upon the unreasoning panic of little earthworms whose frantic terror had caused the destruction of the most sensational figure ever seen upon the planet.

Scientists all but wept and wrung their hands at thought of the irreparable loss to mankind of knowledge which transcended that of Earth. And then the world went mad with joy upon learning that the final remaining tooth of the ancient dragon of Cadmus had escaped the general holocaust and was still safe in the midst of the ruins of the Graham laboratory.

Under the auspices of the Federal Government, guarded by a convoy of battleships, Dr. Graham and a bevy of world-famous scientists were established with the ponderous chrysalis upon an island in an isolated portion of the Pacific Ocean. No expense was spared in the making of that final experiment a success. The last survivor of that ill-fated spatial expedition from Jupiter was destined to be received in cordial and royal style. Elaborate plans were made to set up intelligent communication with the forthcoming Jovian, and preparations for his—or her—comfort and well being outrivaled the fabulous treatment of Gulliver at the hands of the Lilliputians.

THE Hellenic Chrysalis was at last opened. Instead of a man or woman from Jupiter, the last tooth contained only a machine of intricate design and strange potentialities. A metal plate affixed to one side appeared to be a set of instructions addressed to one Mentor 5X9378, in indecipherable characters.

After months of laborious experimentation, Dr. Graham and his eminent colleagues came to an astounding conclusion. Ironically enough, they pointed out, the strange thing was a machine equipped to maintain Jovians at the Earthly stature of six feet! Poor little giant!

A BRAND-NEW FASCINATING FEATURE

WHAT'S your science I. Q.? Are you an intellectual giant or is your cranium the size of Cro-Magnon man's? Regardless, twirl your Phi Beta Kappa key and give the following problems a microscopic scrutiny. If your head's one great vacuum, turn to page 126 for the correct answers.

POSITIVE OR NEGATIVE

The following statements are either true or false. Although some of them appear to be as simple as answering what hit Newton on the head, look before you leap. (Par—15 correct.)

1. Scientists once believed that the fall of meteoric matter into the sun would account for the sun's heat.
2. The Law of the Conservation of Energy is the most universal of all the laws of nature.
3. Not until biologists agree what the distinguishing characteristics of animals and plants are can it be definitely stated whether bacteria are plants or animals.
4. When a person passes from a well lighted into a poorly lighted room, the pupil of his eye contracts.
5. Human life has changed more in the last 50 years than reptile life did in 50 million years in the Jurassic and Permian eras.
6. If a perfectly smooth ball were set in motion on a frictionless plane it would go on in a straight line forever without stopping.
7. Deprivation of food is more quickly fatal than deprivation of sleep.
8. Fish cannot hear.
9. According to William James, the psychologist, it is not correct to say we see a bear, are afraid, and run, but we see the bear, run and are afraid.
10. Wounds are subject to two dangers, infection and hemorrhage. The latter danger is present in every case, while infection is present only in a small percentage of wounds.
11. The modern telescope could teach us but little about the nature of the stars and galaxies were it not for the spectroscope attached to it.
12. The photosphere is one of the most important layers of the earth's atmosphere.
13. The chief gases dissolved in the sea are nitrogen, oxygen and carbon dioxide.
14. If the right connections were made, an electric eel could light an electric light bulb.
15. Gravitational forces are the same on all places of the earth.
16. Every human being begins his or her life as a single cell.
17. The most remarkable fact about the human heart is that it never rests.
18. One of the best first aid treatments for an unconscious person is a drink.
19. Scientifically, evolution is a law of nature and is proved or established as firmly as the law of gravitation and precisely in the same way.
20. Although all life upon this planet depends upon the radiant energy of the sun, if this amount should ever be less than one-tenth of the entire energy radiated by the sun, all life on Earth would cease.

TAKE A LETTER

Here are ten incomplete scientific facts. There are three or four suggestions, compiled by our staff of experts, that will enable you to complete each statement correctly. You'll be doing par if you get seven correct.

1. Doppler's Principle is very useful in determining: (a) movements of heavenly bodies, (b) I.Q.'s, (c) atomic weights, (d) age of the earth.
2. 1939 will be a year of great sun-spot activity. We should expect a similar period in: (a) 1940, (b) 1948, (c) 1950, (d) 1954.
3. The chief factor in regulating respiration in human beings is the: (a) carbon dioxide in the blood, (b) oxygen in the blood, (c) endocrine glands, (d) blood pressure.
4. The main use of the ear in fish is in connection with: (a) hearing, (b) swim-

ming, (c) reproduction, (d) balancing.

5. If a human cell were going through mitosis it would be in the process of (a) respiration, (b) reproduction, (c) digestion, (d) locomotion.

6. The total light we receive from all the stars in the sky compared to the light of the sun is about: (a) one-half, (b) one-tenth, (c) one-ten-thousandths, (d) one hundred-millionth.

7. The most effective method for analyzing light is by means of a (a) prism, (b) lens, (c) diffraction grating, (d) photometer.

8. Twenty-four hours after you have read this the sun will weigh less by about: (a) 3,600 tons, (b) 36,000,000 tons, (c) 360,000,000,000 tons, (d) 3,600,000,000,000,000 tons.

9. Distances of very remote stars are best determined by means of: (a) the triangulation method, (b) the parallax method, (c) the reflecting telescope, (d) the Cepheid Variable Stars.

10. Which one of the following is not a property of an acid: (a) the power to turn red litmus paper blue, (b) the power to unite in definite proportions with the metals, called bases, forming salts, (c) solubility in water, (d) the power of exchanging the whole or part of their hydrogen for an alkaline metal presented to them in the form of a hydrate.

MISSING LINKS

When certain words are given in series they take on a definite meaning. For example, the words red, orange, yellow, green, blue, indigo and violet are merely colors when considered separately. Together they form the spectrum. Below are given five such word combinations—with one of the words missing. Supply the missing link and identify the word combination. Par: Missing words, three; identification, four.

1. Archezoic, Proterozoic, Paleozoic, ..., Cenezoic.
2. Helium, ..., Neon, Krypton, Xenon, Radon.
3. ....., Bryophytes, Pteridophytes, Spermatophytes.
4. Learning, retention, recall, ...
5. Mimas, Enceladus, Tethys, Dione, Rhea, ..., Hyperion, Japetus, Phoebe.

SCRAMBLED STAR-DUST

This question covers the Universe. The following 16 words, properly unraveled, spell out an assortment of astronomical terms, bodies, and instruments. Par on this, with or without a telescope, is ten.

1. eercs	2. leanbu	3. riissu	4. bdoela
5. cpeasr	6. pliseec	7. sparoil	8. staaern
9. drestioa	10. rruucats	11. itscoesl	12. slleettia
13. etetemrio	14. dreamnoad	15. eelriphniho	16. tgbulseeee
17. ratmaplenui	18. ctroseospcep	19. letsononictal	20. mifonttrrreeee

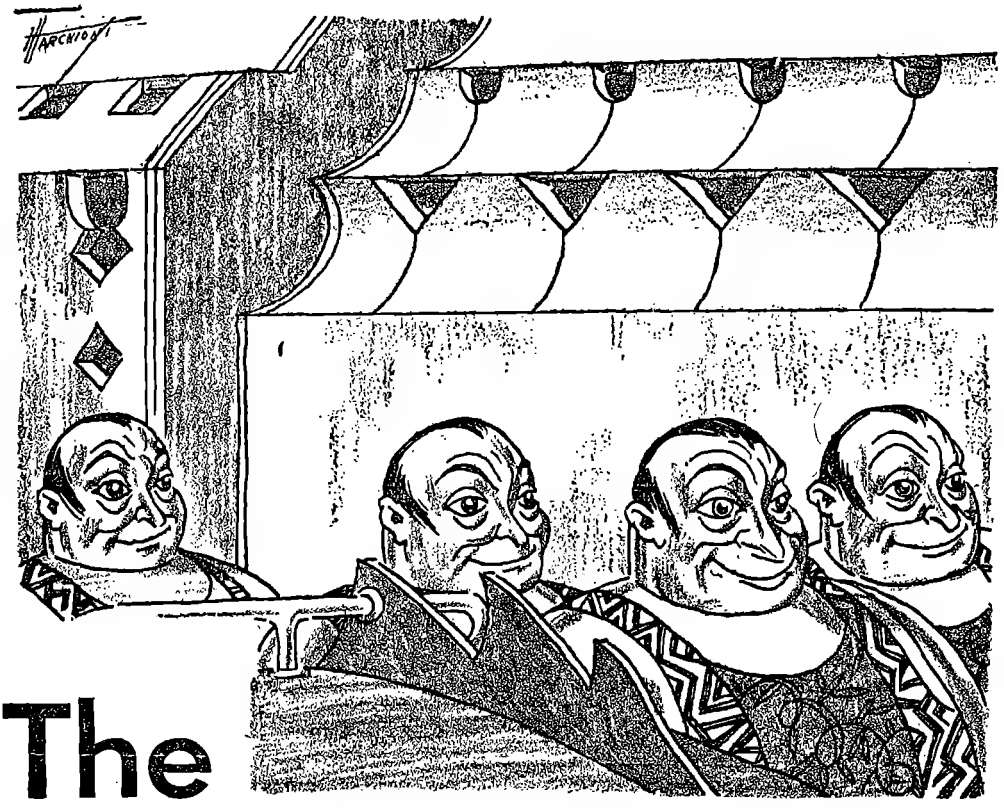
SKY-OLOGY

If the moon suddenly became transparent, how many stars should we be likely to see lying behind it with unaided eyes? In other words, how many visible stars does the full moon conceal? Par: Five minutes.

WHO'S WHO

Here are the names of 15 men who have contributed something to the world of science. In the parentheses of the right-hand column place the number of the scientist who is associated with that particular contribution.

(1) Niels Bohr	( ) circulation of the blood
(2) Robert Boyle	( ) volume and pressure of the air
(3) John Dalton	( ) discovery of oxygen
(4) Sir Humphrey Davy	( ) atomic theory
(5) Michael Faraday	( ) invention of the dynamo
(6) Sir Francis Galton	( ) wave theory of electricity
(7) William Harvey	( ) discovery of nature of chlorine
(8) Oliver Heaviside	( ) quantum theory
(9) Robert Koch	( ) bacteriology
(10) Clerk Maxwell	( ) orbits of electrons
(11) Max Planck	( ) wireless waves
(12) Joseph Priestly	( ) wave mechanics
(13) E. Schroedinger	( ) eugenics
(14) J. J. Thomson	( ) discovery of electrons
(15) Hugo de Vries	( ) mutations



The BRAIN PIRATES

Two Roving Planeteers Confront the Invisible Imps of an Empire From Beyond the Sun and Discover That Matter Is Mightier Than Mind

BY JOHN W. CAMPBELL, JR.

Author of "The Double Minds," "The Tenth World," etc.

CHAPTER I

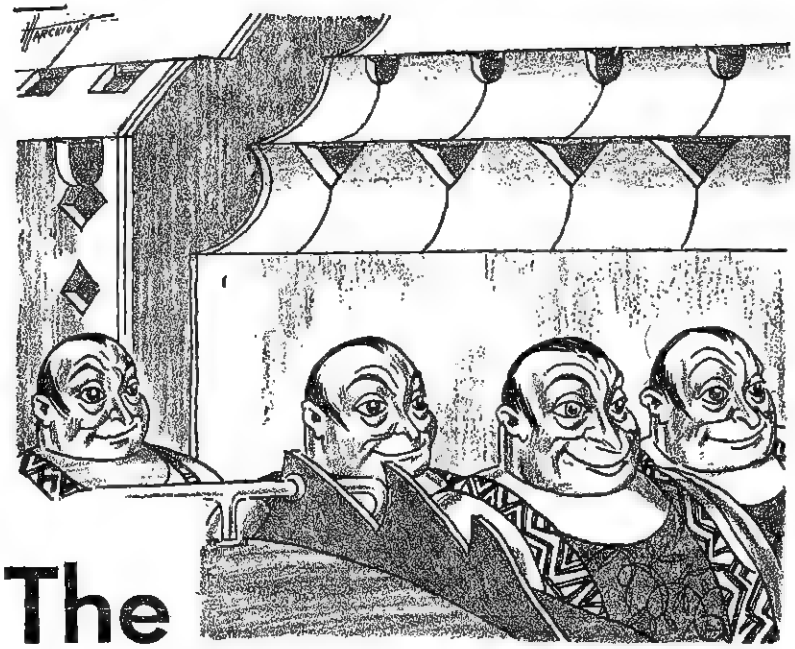
Double Gravity

THE *Ion* propelled itself powerfully through the void. Inside the craft, Rodney Blake's arm reached out in a dramatic gesture of disclosure. Half a hundred thousand miles away hung a dusty, underripe peach. It was dim and hard to see, here where the sun's light was diluted by five billion miles of space.

"There she is, skipper," he told his permanent partner, Ted Penton. "The only satellite of the Tenth World! Are we still going to investigate it?"

"We sure are. As long as we are

Intrepid Scientific Adventurers of the Thirtieth



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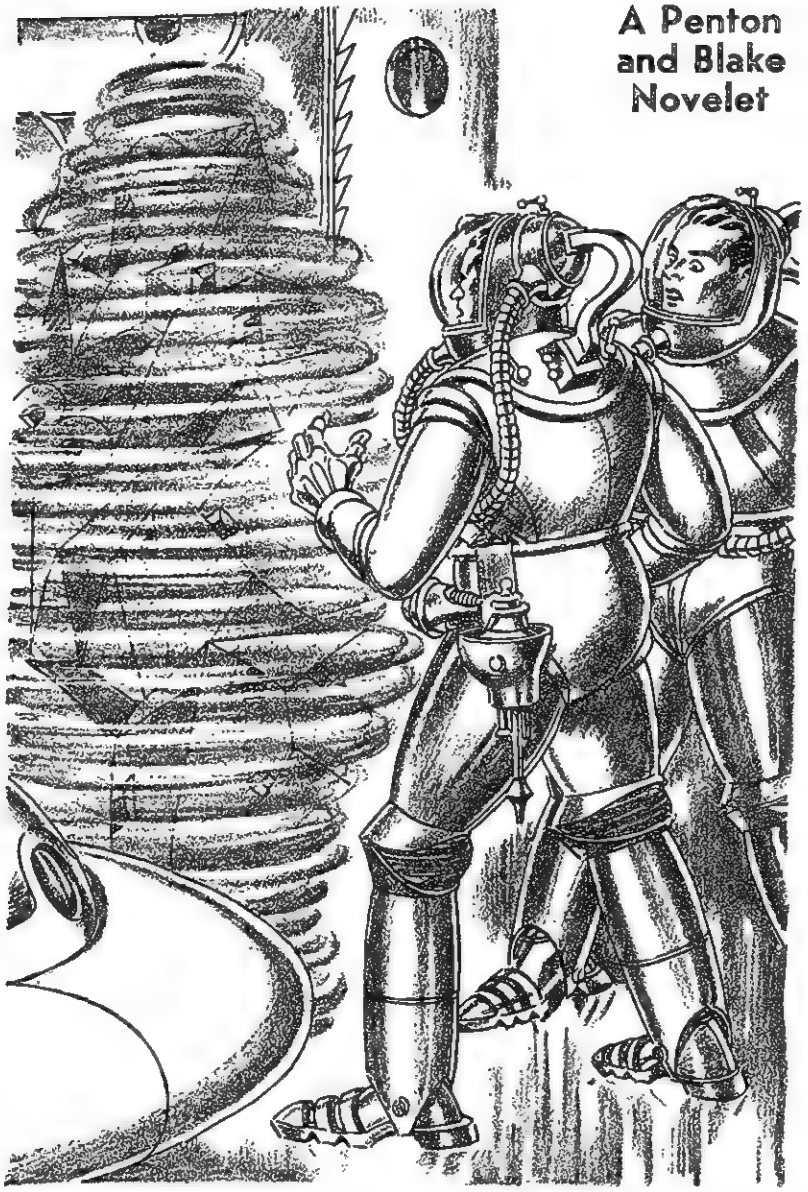
Intrepid Scientific Adventurers of the Thirtieth

A Penton and Blake Novelet



Penton saw a curious riot of colors and angles

Century Explore the Far Regions of Space!

A Penton and Blake Novelet

Penton saw a curious riot of colors and angles

Century Explore the Far Regions of Space!

this far out from the sun, we may as well see what's seeable," Penton answered firmly. "We have those new suits rigged with atomic-powered lifting gadgets, so that'll protect us from the weight, if what our instruments say about that world's true. I still don't see how any member of this System could be so confoundedly dense. This satellite has a diameter of thirty-four hundred miles, yet the surface gravity is double that of Earth!"

Blake whistled softly.

"Incidentally," he said, "we ought to land in about half an hour. Any suggestions as to where to go? Try your telescope."

Penton disappeared into the observatory booth and came back presently with a rough-sketch map.

"I was up there just before I slept. That was nine hours ago, and this place here on the sketch was in the nightshade then, glowing faintly. I think it may be a highly radioactive section. Looking through the 'scope just now, I see it has moved into daylight, and the glow is hidden by the sunlight, weak as it is out here, but there is some funny, rainbow colored mineral formation there. Let's land there. I'll go check up on those suits, and make some adjustments. I hadn't thought they'd have to handle any double-gravity worlds."

"That's a swell map," complained Blake. "You've drawn the thing from the image in an astronomical 'scope. It's inverted. I'm going to be too busy to figure out mirror images. And may I suggest that you make sure you don't get those drive-units in the suits backward? I'd hate to have them sit on me as well as a doubled gravity."

Penton grinned and went down the corridor toward the airlock, picking up a kit of tools from the machine-shop bench as he passed. Presently he was deeply engrossed in the delicate task of readjusting the tiny atomic-power drive units he had fixed in the space suits. The mobility these would furnish would have been highly welcome at the time they had been visiting the Tenth World.

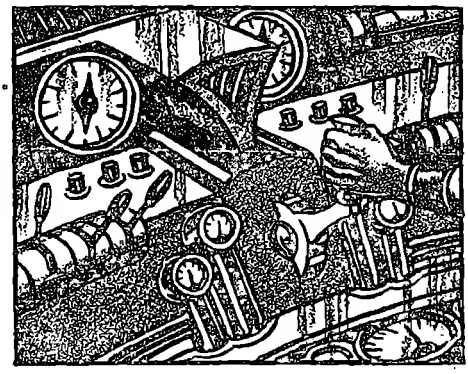
"Oh, Ted!" Penton raised his head abruptly from the work of fastening down the cover plate that engaged his attention for the past twenty minutes. The slightly metallic voice had issued from the air-lock speaker over his head.

"Yes?"

"We're about to land," said Blake's voice. "Help take over. Throw the switch. And I hope those suits suit us!"

PENTON and Blake stared fretfully through the windows of the *Ion*. The inhabitants of the satellite were regarding the explorers with a mild curiosity.

"Those birds are waiting with remarkable patience," Penton said, somewhat annoyed. "And this seems to be the local Central Park, wherefore our



landing may have annoyed them. Come on, you have a UV gun on one hip, and a disintegrator on the other, and—"

"Lead in both legs. Did you notice that local yokel to the left of us make a slow, stately bow? He snapped like a flag in the wind. I'll bet they can move five times as fast as we can—or at least two times as fast. This gravity's faster."

"Not faster than 186,000 miles a second," Penton declared firmly. "Did you observe them closely? Mount one olive on one grapefruit. Two fat sausages protruding from the opposite sides of said grapefruit just below the olive, two fatter frankfurters at the nether end, all add up to equal one—Tenthworldsatelliteian."

"They do have a chubby air," Blake grinned, "but I don't claim to move 186,000 miles a second. And these boys do move fast."

"They're patient anyway, much more so than I am. Lift your blasted carcass and come on. They're a pretty human looking gang, even if they do look like prize-winners in the Fat Men's Club. Besides, fat men are always jolly. You know as well as I do that you're coming in the end, so let's go."

Reluctantly Blake heaved. He heaved harder, remaining curiously fixed to his seat.

"Boy, am I agile," he grunted softly, and gave in. Slowly he turned up the lift-control at his belt. A slow creaking of straps and an unhappy wriggling on Blake's part attested to the increasing power of the atomic drive mounted on the suit. Blake rose. "I can't even stand up without the aid of this thing. Let's go."

Penton opened the outer lock door. Blake stepped down, or better, floated down behind Penton. The gravity-equalizer made him feel as if he were riding on a parachute. Penton faced the strange inhabitants and slowly raised both hands above his head in a gesture of friendship.

He'd intended to hold them out horizontally in front of him, but the effort, under that gravity, was distinctly uncomfortable.

"From a much lighter world, aren't you?" suggested a rather philosophically friendly telepathic voice. "From an inner planet? Well—I have always been convinced there were more than five inner planets."

"Ten," said Penton automatically. "We're from the third."

One of the immensely rounded inhabitants of this world n o d d e d in pleased acknowledgement.

"Ah, interesting. Very. The third world, then, and there are twelve."

"Twelve?"

Blake s t a r e d at the moon-faced spokesman.

"Oh, so, so. Ah, yes. Two more. That makes twelve. That's even more interesting. There are two worlds further out. Remarkably small eyes you have, if I may say so. The bright light near the sun, I suppose."

BLAKE nodded v a g u e l y. The moon-faced inhabitant did have large eyes; it was only the immense roundness of his face that made them appear small. Now at the ground level, Blake could better judge their height and size. About five feet tall, each was, and approximately six feet in circumference at the equator—which was quite marked. They resembled diminutive, but well inflated carnival balloons made in caricature shapes.

"It looks," said Penton softly, "as though we'll have to go way out before we go back toward the sun. We'll have to see those two worlds."

"Yes, see them. Interesting ship you have. We've been trying for some time to make one like it—atomic power, eh? Yes. Will you accompany us? . . I, by the way, am Terruns, associated with the Power and Mechanisms Department of Runal City. Oh, this world? We call our primary Turlun, and our satellite here is called Pornan.

"But I think we may go to the city. The members of the Power and Mechanisms Department have been very anxious to speak with you since your ship was first sighted. There was rather a flurry there as to where you would land. Very proud to have you in our city. You will come? Our cars are ahead."

"Why—yes," said Penton, slightly bewildered. Then, more firmly, "Yes, we will be very interested to see more of your civilization on this world so far from the sun. Our lives, our civilization, you understand, are all based on the movements or apparent movements of the sun."

Terruns waved briskly in a vertical plane. His remarkably rotund body did not crease, so far as Blake's closely watching, interested eye could determine, but simply contracted vertically, and spread laterally in front, with a reversal of this process in back. The queerly hectic bowing of the comically grapefruitish body fascinated Blake with the same childish wonder that the incomprehensible leg-work of the millipede inspires.

Terruns straightened abruptly and regarded Penton closely with large, dark eyes.

"The ship, by the way. It does not move in your absence?" he asked some-

what anxiously.

Penton looked at him somewhat blankly.

"No, it is manually controlled—it will stay where it is."

The round face parted in a somewhat fatuous smile of satisfaction.

"Ah, excellent. Yes, if it stays there, that will be well. You will know it is here. Come with us. Yes, a lighter world. The supports in the suits—very ingenious, very—" His mental speech faded off gradually. Blake and Penton watched with interest as the dozen or so Pornans set off in perfect unison across the close-cropped turf. Each was dressed in a precisely uniform outfit of apparently skin-tight elastic fabric, of a rather pleasing, greenish hue in itself, but covered with a repetitive and complex pattern of spirals and sharp-angled zigzags.

THE Pornans' legs were rather short, and distinctly over the "stout" classification. But they worked like frantic pumps, bouncing up and down at a flurried pace, while the associated body rocked and rolled in a manner curiously reminiscent of a round-bodied bell-buoy in a choppy sea. But they made progress, such progress, considering their girth, that for a moment Blake and Penton stood in astonished surprise, while their guides almost disappeared over a little pink swale of land.

"Did you notice the turf?" Penton asked Blake as they followed behind. "It's apparently a sort of moss, and a remarkably pink one at that. But then, the trees are, too. Incidentally, they don't use sunlight as a source of energy, of course. Look, our hosts seem to have arrived at their car."

A moment later, Penton and Blake had arrived also. There were, accurately, three cars. They were very commodious cars, until the Pornans climbed in. They accomplished that act with a surprising ease and actual grace, despite their immense girth. The cars themselves were merely open platforms, in effect, seating six Pornans in three cross seats, two to a seat. Each place was equipped with a very solidly made rail, on which the passengers immediately placed both feet. Their hands settled comfortably, and firmly into handgrips in their seat-arms.

Four wheels, scarcely eighteen inches in diameter, and consisting exclusively of pneumatic tires supported the vehicle, and a small square case behind the rear-most seat presumably contained the engine. From the size of its case, it was a wholly inadequate engine. But the two explorers clambered in.

"Hold fast," said Terruns, cheerily. "It's only about a fifteen-minute ride." Curiously, the time-designation was quite clear to the Terrestrials.

CHAPTER II

The Invisible Car

TERRUNS stabbed viciously at a red button on the panel that formed the front of the car. Something in the box at the rear muttered faintly, and began throbbing furiously. Rapidly, from the sides, a pinkish mass protruded, until inside of ten seconds a pneumatic bumper fully two feet thick had pushed out all about, front, side and rear.

"We're going," said their guide cheerfully, "to the center of the city. Power and Mechanisms Building; where all our broadcast energy is developed."

Blake understood suddenly the purpose of the rails and handgrips. The motor, whatever it was, was far from inadequate. The car moved to speed with a rush that snapped his head back viciously.

"We power nearly everything," continued Terruns, "by broadcast energy. Source of energy's the trouble. Very troublesome, because it's a frightful job concentrating the radio-active ores. Lasts a good while, but power demands growing faster than ore-concentrate available. Perhaps—"

Blake closed his eyes and held on as Terruns sailed blithely toward the side of another car coming out of a side street. Abruptly he was hurled from

his seat, and draped over Terruns' immense shoulders. The Pornan yielded softly under him, but not sufficiently to cushion the violent shock. Blake opened his eyes to observe the details of the collision, and saw Terruns' head turned completely around on an amazingly flexible neck, regarding him in faint surprise.

"Ah, yes, light worlds. So. So sorry. I'll slow down more gently." The head pivoted outrageously, and the car jerked forward, depositing Blake in his seat once more.

"Penton," said Blake softly, bracing himself solidly, "can you find the way back? I want to walk." He closed his eyes again, for they had left the roadways of the park and entered the heavy, city traffic. It was, quite evidently, suicidally inclined, or else controlled solely by inspired maniacs.

Somewhere in the depths of his mind, the thought popped that here, evidently, the movies got those impossible scenes of a mad ride through New York traffic at impossible speed. Not that the cars moved rapidly. At their best, in fact, Terruns had maintained no better than twenty miles an hour; but the utter indifference to safety, the half-inch margins gleefully accepted by the drivers made that insane recklessness.

The purpose of the huge bumpers inflated about them seeped into Blake's mind. His eyes refused to close again, because he wanted to know which way to jump. A brilliantly green vehicle tore down from a side street, swinging toward their rear as it appeared that they were to escape, then braked violently to permit them to move out of the way by a fraction of an inch.

"Traffic," said Terruns somewhat annoyedly, "always disturbs me. How do they control traffic in your world?"

"The problem is worse," said Penton through clenched teeth, "though less disturbing to us." He paused to grip violently and brace himself as Terruns braked the car to a dead stop in a distance that did not exist. "Traffic lights—not so disturbing to us, because braking—"

"Ah, yes. Very difficult on light world." Traffic moved again, jumping forward as though seen on a broken film, inexpertly patched. They were in motion. "The traction is much less, on a lighter world, is it not? The inertia to mass to weight ratio—"

BLAKE looked around with a sudden relief. He had been too startled and frightened to think. On this world, where great weight forced their tires solidly into the greenish glasslike pavement, brakes were infinitely more efficient, and—

They took a right-angle corner with an abruptness that had him half out of the car, his feet on the thick, pneumatic bumper before he gripped the rail and pulled himself in again. And—cars gripped better on turns. The mad driving was comparatively sane on that basis.

"I have no patience with some drivers we have," Terruns told them. "Reckless. Use no judgment, and show no respect for other people." No sooner had he said this when he halted his vehicle a sickening half an inch from the bumper of the car ahead.

"Relative," said Penton softly. "All things are relative—especially speed and acceleration," and gripped the rail in preparation for the next start.

The road narrowed, became a two-lane street. Blake was recovering, as the better understanding of local conditions penetrated. Suddenly there was a violent explosion from the empty air directly ahead of them, a flash of violet flame, and white smoke. Instantly Terruns jammed on the brakes, and a violent thud of pneumatic bumpers crashed the car to a halt so short that Penton and Blake both sailed into the air.

They sailed along for some hundreds of feet through the air before descending, their lifting units now advanced to support them entirely. A series of popping explosions like a string of firecrackers sounded behind them, and a howl like a dog whose paw has been stepped on followed and accompanied.

Together the Terrestrials looked back. Terruns and his followers were looking at them in mild bewilderment. Its great bumper hard against that of the machine they had so recently quitted, a similar vehicle carrying two

Pornans occupied the formerly vacant volume of air. These also were watching the Terrestrials with interest.

"I think I know," said Penton in slow disgust, "why they go only twenty miles an hour. Will you tell me what in hell is the idea of driving around in an invisible car? Or is that the police system here? If it is, I consider it notably screwier than even this wabble-eyed planet. Great Wavering Worlds!"

TERRUNS nodded toward them with evident relief on his face.

"Remarkable—very remarkable, your flight. For a moment I feared you might land rather heavily—but why didn't you just hold on? We usually do." For a man of his girth, he displayed a surprising ease in the agile jump that carried him over the enormous bumper to the roadway. The driver of the other car jumped down to meet him, and the two bowed jerkily in perfect unison. Together they walked to the point of collision.

The two cars nuzzled each other like amorous hippopotami. Terruns inspected the front of his machine as Penton and Blake approached, Penton's mouth somewhat angular.

"No damage?" suggested the driver of the second car.

Terruns beamed cheerfully.

"No damage," he agreed.

The second driver swung nimbly into his seat, nodded good-by. His car swerved violently backward, braked, then swung forward and away with a savage acceleration.

"Is it customary to drive around in invisible cars?" interrupted Penton plaintively. "I should think it would make traffic more than a little confusing."

"Sorry, my friend. Very unusual now. But no damage, no damage at all. In the last six months, but two people have been killed in such collisions." Terruns looked rather proudly at the enormous inflated sausage that circled the car. "Some of my men developed that. Very effective—very simple."

"Excellent, no doubt. But why have invisible cars in the first place? You were, I assure you, no less surprised than we that we did not land heavily. And how do you accomplish that invisibility?"

Terruns sighed.

"Not by choice. We don't accomplish it. Look. Come—" Terruns started forward to meet the slowly approaching Terrestrials. Suddenly his immense body seemed to tangle in his feet, and he fell with a resounding crash. The force of the impact dented his pudgy body by several inches, and for a moment he lay there, rather startled eyes slowly winking. A queerly mischievous, chuckling gurgle came from the empty air beside him, and it seemed to Penton that a sort of vertical heat wave in the air danced down the street, to vanish as suddenly as it had come into being.

Terruns' large eyes blinked once more, and he shook his head. He rose to his feet with a sigh of annoyance, just as one of the hurrying Pornans from the rear of the car reached him.

"Damn *krull*," he exclaimed. The frown faded from his moon face and his usual good-natured philosophy seemed to rule again. "Unusually persistent, wasn't he? I suppose he has gone. Ah, well. I could smell singed hair. I hope he learned something."

Blake stared at him in considerable wonder.

"What is a *krull?*" he asked.

For once, Terruns did not reply immediately. He looked thoughtfully at Blake, and even more thoughtfully at Penton.

"Monkey," he said at length. "Ape—no, monkey." Then he nodded, smiling as usual, somewhat vaguely. "A *krull* is somewhat like your monkey. A higher species. Quite intelligent. Delights in mischief. Smaller than we are, and very bony. Oh, very." Terruns rubbed his pudgy leg vigorously, the soft flesh denting deeply under his fingers.

"Are they—invisible?" Blake looked about him vaguely. "I gathered you had tripped over one, but unless they are a good deal smaller than you, I don't see how I missed it."

Terruns nodded sadly.

"They disrupt economic life. Mischievous, just mischievous. And they love excitement. When we first started

using automobiles they caused no end of excitement. All our higher species have telepathic powers. *Krulls,* very sad, have great powers. Not intelligent, not quite reasoning, perhaps, but almost. And remarkable vision. Eyes unlike ours. One on each side of the head like—oh, your rabbit? Rabbits see in all directions also? Yes, so do *krulls.* And telepathic, marvelously so. That makes them invisible."

Penton looked at the Pornan thoughtfully for a moment.

"Sorry, my friend, you have skipped a step somewhere. How does that make them invisible?"

"Well, now see. You see me. Now —" Terruns grinned and wasn't there.

CHAPTER III

The Stolen Ship

PENTON wiggled his head slowly, and looked more carefully. Definitely there was a large, and conspicuous hole in the landscape, a large, grayish mist that swirled and seethed with a curious riot of colors and angles and impossibly shaped buildings.

Abruptly Terruns was back. Blake looked at him with considerable distaste.

"Can all of you do that?"

"It's very simple," nodded Terruns. "But we can't see like a *krull.* I merely telepathized the idea that I wasn't there. Momentarily you were deceived, but quickly reasoned that I *must* be there, because of the hole in the landscape. Therefore you saw me again. A *krull,* of course, sees in all directions, and therefore can fill the hole in the landscape by telepathizing two things. He isn't there. You see the landscape. Very simple."

Blake looked at Penton from the side of his eyes.

"Ted, shall we go for a walk? Back to the ship, maybe. Somehow telepathizing imps don't promise well."

"They make themselves completely invisible in that way?" asked Penton.

"Quite," Terruns replied. A more serious expression crossed his face as he explained further the troubles of his people. "And worse, as you saw. They make automobiles invisible. Sit on the bumper in front. They like excitement, and that sometimes makes a lot of excitement." His face lighted a bit as he nodded toward the car, "But not so much since the fire-vents were installed."

"Oh. Explosives?"

"Yes. Serves two purposes. First, if I see a car coming toward me that doesn't seem to see me, I know a *krull* is riding in front. I press a button on the panel. Explosions warn other driver, and we both brake sharply. Also explosions immediately under *krull* usually induce him to move. Frequently the *krull* gets caught between cars, which is very good. Usually," he sighed, "they escape, merely somewhat singed. But they are intelligent. They learn."

"Why the devil don't you drive them away?"

Terruns smiled sadly.

"How? We would very much like to. Oh, no end. But no results. They steal our food, they steal anything that will move. Don't attack us, because we are very much stronger. Very hard to shoot what you can't see."

"Great Worlds, Terruns, can't you get rid of the creatures somehow? Use colored glasses so you see differently than they, and make them visible. Any trick like that?"

"Trick? Oh, my dear friend, the mind is tricked. It does no good to trick our eyes, when our minds are tricked. We have tried a truly remarkable assortment of mechanisms," Terruns sighed, "but none of them work."

"From your fall, I should think people would be badly injured tripping over the blamed things," Blake suggested.

"That's why we wear these suits," Terruns replied.

"Suits?"

The moon face split in a good-natured grin.

"I'm not quite as large as this. It's the protective suit. It bounces." The Pornan touched something somewhere in his suit. Rapidly the seemingly skin-tight suit shrank. It hung in folds, dis-

consolate droops and lumps all over him. Then the elasticity of the suit began to work, and slowly it crawled back to a skin-tight fit in fact.

AN utterly different Terruns emerged. His body was squat and enormously powerful, the huge chest heavily banded with thick sheets and cords of muscle, great rippling cords of it flowing into thick, muscle-ridged arms. His torso tapered to a narrow waist, then expanded into blocky, corded legs. Far from pudgy, there was not an ounce of fat on that perfect specimen of the powerfully muscled denizen of this heavy-gravity world.

And with that alteration, his face seemed now subtly changed. The roundness was not the fulness of fat, but a roundness of differently shaped bones, and differently placed muscle-cords. The roundness differed from a human face as a bulldog's round face from the lean jaws of the wolfhound.

Blake whistled softly.

The Pornan's good-natured smile reappeared.

"Different worlds—different people."

"Different worlds," repeated Penton with a gentle moan, "different people. I, Blake, am different for life."

"Do you still remember that—six long hours ago? Old Elephant Penton. Can you remember anything else that was said?"

"Little." Penton moved gingerly. The motion, inasmuch as he was floating in Terruns' salt-water-filled swimming pool, sent his nose under the surface. He straightened out with hasty caution and a soft, but heartfelt remark. "Damn little. Six hours under doubled gravity and—" He stopped and looked up. Terruns was standing on the edge of the pool looking down at them with sad reproof.

"I asked you," their host said reproachfully, "I asked you particularly, but you said the ship would not move if you weren't there."

"Right," agreed Penton, paddling gently to bring himself to a vertical position. "You asked, and it won't."

"Sorry," Terruns shook his head. "Report from the Park Department. They can't find it. They didn't expect to see it. We never see things like that, but they can't feel it. Very unusual, if it can't be moved."

"What? Can't find our ship?"

"You said," Terruns began. He stopped abruptly as he leaped violently and awkwardly into the air, to land in the pool with a mighty thunder, and a tidal wave that all but swamped the Terrestrials. Immediately the inflated suit brought him bobbing to the surface, lying on his stomach, his arms moving uselessly because of the airtight suit. They would not grip the water. Simultaneously there was a chuckling chatter and a loud *thump*.

Terruns released a mighty "oof" and sank six inches into the water. The chattering went on excitedly from empty air, while a mad splashing began on both sides of the balloon-clad Pornan, as though an invisible side-wheeler in a frightful hurry had gone slightly askew. Terruns was gasping heavily, half stunned, while his body began to move in hurried circles to the accompaniment of much chattering.

Blake and Penton stared in paralyzed astonishment. Terruns recovered his wind, reached the tab on his suit, and Pornan and invisible rider plunged into the water. Instantly both struck out for the shore, and the *krull*, too busy otherwise to remain invisible, appeared.

A rabbit-eared, rabbit-faced, four-limbed creature the size of a ten-year-old child, it had a surprisingly chunky body. Details of arms and legs were rather blurred, as both were working with a truly amazing determination and efficiency. For a moment Terruns was handicapped as his suit shrank back to fit; then he too got into action. Arms churning like twin propellers and both feet going in a white froth of water, he overhauled the shrieking *krull*, a six-inch bow wave curling about his ears.

THE little creature bounced out of the water when it reached the pool edge, and disappeared the instant it hit the tiled floor. Immediately behind it, Terruns swarmed up the lip of the pool and set off down the tile like a bloodhound on the trail. The wet animal was dripping revealingly. Halfway

to the arched door at the far end he skidded to a halt, and grabbed at the air. A yowling shriek greeted his move, and triumphantly he raised his arm. The shrieks continued but nothing appeared as a source.

Terruns walked back toward the pool more leisurely.

"You said," went on the Pornan calmly, "that it couldn't be moved, but it was. It isn't there." He reached the edge of the pool, and bent down. The shrieking chatter mounted; as he lowered his hand a hole appeared in the water, then a white froth. "Presently, my friends, I shall show you a *krull*. Very reckless fellow. They love to go paddling, though." The shrieking chatter had changed to an unhappy glubbing and a thunder of splashing water. Slowly the glubbing and splashing reached a climax and died away. The pool-edge, the water and even Terruns wavered and twisted crazily in appearance. Then a wet, feebly kicking, half-drowned creature appeared, about six inches below the surface of the water.

"Oh," said Penton distastefully, "we have 'em on our world, too. They appear and disappear, and sometimes only one person can see them."

"You do?" asked Terruns with interest.

"Sure," said Penton. "We have a drug that makes them visible. Alcohol. We call them D.T.'s."

"Deetees," said Terruns mildly, looking down at the wet, slowly reviving creature. "Curious." The *krull's* rabbit ears drooped dejectedly, bright green rabbit ears drooping over a bright red face. The red faded gradually into a handsome purple body, marked by a large and unnaturally brilliant orange stripe down the middle of the back. Constant wear had removed all hair from feet, hands, and other parts frequently in contact with the ground, exposing the bright red skin.

"Maybe," said Blake, "you should leave it alone so it will recover rapidly. They really are more pleasant to look at when they are invisible."

"Could you tie that thing up somehow, Terruns, so we can experiment on it?" asked Penton wearily. "I have an idea that we'll have to hunt for our ship."

"Oh, yes. The medical staff is here, by the way. I'll tie it up, you can get out of the water, and they will strap you up more comfortably."

"You're sure that ship is gone? I don't see how a *krull* could move it."

"Not one *krull*. A troop of *krull*. We always fasten down anything movable. Even stones. They love to put them in the street, and sit on them. Very exciting crashes. A troop of *krull*, I'm afraid—but they won't carry it more than five miles or so. They lose interest quickly."

"Penton," said Blake softly, "you know, I left the lift-drive on seven-eighths, so the ship wouldn't mar the turf. I'll bet we are here three months looking for that blasted thing. Five miles and an invisible ship. More fun—"

"I'd take you up on that bet, Blake, but for one thing. I *know* we won't be here three months looking for it."

"Why?"

"Because we have emergency rations in the suits for only one week, and they use a mixture of copper selenate and potassium arsenate for fertilizer on the local crops. Laugh that off."

"You left out potassium cyanide," Blake groaned.

"I didn't leave out cyanide; that's about the only poison they don't use. All their plants want nice heavy metals like lead and copper and mercury. For non-metals they prefer the heavy ones like selenium and telurium and arsenic. This world, it would seem, is lousy with heavy metals, and so are the plants. And due to a sad neglect in my education, I never learned to digest those compounds."

CHAPTER IV

End of the Krull

BLAKE looked down at himself thoughtfully. Elastic bandages wound in puttee fashion about each leg joined and wound up on his abdomen to his chest. He squeaked faintly when he moved.

"Did they give you the oil can, Ted?"

"No. But this should make a good shock-absorber. Step on it, will you? There's a chauffeur waiting to take us down to the Powers and Mechanisms Building again. Terruns said he'd meet us there."

"The bird that wrapped me ought to make a living as a mummy-maker. Did Terruns say how they go about looking for lost things?"

"Their search methods are simple and ineffective; gang of men with a long rope between them. Hurry up; I'll wait outside."

Half an hour later they joined Terruns at his office, slightly jittery, but somewhat to their own surprise, in one piece. Terruns, they had learned during this last ride, was a careful driver, indeed, for a Pornan.

"Ah. The Terrestrials," he greeted them. "Sit down." Terruns waved them to a seat with one hand. Thoughtfully, Penton noticed that Terruns' desk was of a rich, red wood finished with brightly chromium plated fixtures of quite familiar design.

"If," said Penton softly, "we don't find that ship in about three weeks, we'll be gone, because we use food faster here. I've already eaten twice of those emergency rations."

"Feeding," acknowledged Blake unhappily, "but not filling. If you hear me grumble, it's my stomach, over which I'm losing all control. It is distinctly annoyed at what it righteously considers my perfidy. That one-inch lump of extinct sawdust, labeled 'one sirloin steak, 350 cal.', didn't fool it a bit. It's just as hungry as ever."

Penton nodded at a luscious-looking dark violet fruit that Terruns was toying with.

"If you ate that, Blake, your stomach would quiet down almost at once. Certainly within two hours. On Earth we mine ore that doesn't assay as high a mercury content as that thing has. Shut up and let me think."

"Why don't you rig up a radio doodle-bug?" suggested Blake. "The inductance of the ship should be darned easy to spot, and working the way they do with those—"

"Doodle-bugs are out," sighed Penton, "I thought of that. They're fine for finding buried metal, but they have two troubles here. Pornans broadcast power, which I have studied carefully while you were studying their ore-handling machinery. But they do not use radio methods. I gave Terruns complete data on radio. In six months or a year he'll make an effective radio tube, I'll bet.

"If you want to wait for that—in the meantime all our tools are in the ship. The electrical field method doesn't work because that requires an amplifier. The magnetic induction won't work till we are already so near you'd find it quicker with the rope method they use."

"Yes," sighed Penton, "but no ship." Blake turned to Terruns.

"How long will it take them to run that search out to that five mile circle?" he asked.

"Ah," said Terruns hesitantly, glancing at some sheets in front of him, "two months and three days, the last time. But more men this time. A month, perhaps? Not quick enough—I'm truly sorry, but you have no idea how annoying these creatures are to a decent, civilized—"

"Stomach," suggested Blake unhappily. "We're rapidly finding out. You've no idea how annoyed we'll be as we slowly starve to death. Oh, no idea."

PENTON interrupted.

"Listen," he begged Blake, "will you eat that fruit over there and shut up one way or another? I'm trying to think. There must be some way—this thing's gone on too damned long now."

"Oh, yes, much," agreed Terruns. "We're doing all we can—"

"I know. We're not blaming you or your people," Penton grinned. "You are doing your damnedest, I realize, but the thing's senseless. There must be some way to stop them. This world of yours is too monotonous for your own good. Always warm, everywhere. Always light, every—yeah. So it is. Sweet—Terruns!"

Suddenly Penton jumped out of his seat with all the speed of a Pornan, his hand flashing back to his pack. Abruptly his hand was leveling a short, lensed

tube at Terruns' startled face. The Pornan first bent back in his chair hastily in startled amazement, then, thinking the tube a weapon, his hand darted out like a striking snake to twist the cold, crystalline eye of the tube away from him.

Penton dropped his tube with a howl of pain and leaped back, shaking his hand, but grinning sheepishly.

"Sorry, Terruns, must have startled you," he apologized. "Look—it's harmless—just a light." Again he picked up the tube, in his left hand this time, and turned it on Blake. The brilliant light beam of his atomic flashlight stabbed sharply into Blake's face forcing him to blink, squinting until his eyes became adjusted.

"Yes," said Terruns, uncertainly. "Most—er—confusing. Your thoughts are not at all clear."

Penton turned the beam of light into Terruns' face. The Pornan shut his eyes at once, throwing a hand up to his face.

"It's very brilliant, uncomfortably so. Could you turn- -turn it s mewhere else—oh. Yes, turn it away."

Penton turned away the light with a sigh of relief.

"That, Terruns, is all I want to know. Look, take these, and make 'em fit somehow. And come on, we're due for some good hunting." Penton passed over a pair of space goggles, and reluctantly Terruns adjusted them to his face.

"It's an unpleasant sensation," he told the explorers. "But yes, I think, my friend, that you have solved, with your other-world mind, a long outstanding problem. Just one moment and we will be on our way. Oh do you have another pair for my friend, Drunath, a very excellent gentleman? Spent his life finding quicker ways to kill *krull*. Just down the hall—"

Blake passed over his set of space goggles in blank wonderment. Presently the four started down, and out of the building, into a side street that Terruns recommended for a test. The test was wholly inconclusive.

"The park," said Drunath slowly, "is always infested with *krull*. There is a wood, a group of trees, that has not been properly searched in fifty years. Ropes cannot be used. Shall we go there?"

Half an hour later, cars had deposited them, together with a troop of Drunath's extermination squad. Penton and Blake for the first time had an opportunity to walk through the spot where the ship should have been, a remembered swale between a little hillock of pink turf and a vine-covered outthrust of black, glistening rock. It rose some hundred feet to a huge, rugged boulder that looked strangely like a lop-eared *krull* with an ugly, grinning face.

"*Krull* Rock," explained Drunath. "Always search it first for anything smaller than an automobile. If there aren't any *krull* there, there aren't any in town."

BLAKE looked up. Black rock, jumbled boulders, and creeping vines. Bright metal testified to a complete ring of steel traps, all unoccupied. Penton was working with his flash, adjusting the tiny atomic generator it contained to maximum power. Then he pressed the little button.

A low hum came from the instrument, then a shaft of light unbearable, corruscating brilliance. It shimmered from the black rocks in a scintillating, twinkling rain—and vanished as Penton released the flash. Slowly, Blake's eyes adjusted themselves. Then again the flash, and again, till it was on full, and Blake's eyes had readjusted to its light.

Penton was chuckling softly. The air was full of soft whimpers, and little screeches. They turned to howls of dismay as Penton and Blake, unsteady for laughter, picked off dozens of the crazy-quilt *krull*. Their UV pistols working methodically, they cleaned out the entire colony of the beasts perched on the rock.

Slowly, unsteadily, Terruns and Drunath were firing.

"Curse all Gods, destroy all devils, and particular maledictions of *krull*," Drunath exclaimed. "Your goggles are inadequate. I can hardly see through them. For the first time in my life I can dimly see a colony, a whole troop of *krull*, and I cannot shoot straight!"

Drunath threw down his weapon in disgust. "Can you," asked Blake, "see what is on top of that blasted rock?"

"Fire. It looks like fire to us."

"Not fire. Metal. A whole metal ship. Your idiotic *krull* didn't carry it two hundred yards, but just up above where your search methods weren't worth a damn. We will move it."

"You are leaving?" asked Terruns sadly.

"Not," Penton assured him, "by six planets and a dozen moons. We're staying for the shooting. And, oh, my friends, what royal and unadulterated joy I'll take in running the last of those *krull* out of this town." Penton and Blake lifted simultaneously into the air, and within a few seconds into the ship.

Alone in their space ship a day later, Blake puffed complacently at a cigarette.

"I would still like to know just how you thought of it. It's an excellent way, I don't dispute, but how did you figure it out, Ted?"

Penton smiled affably.

"What big eyes you have, Terruns. The better to see with five billion miles from the sun. Look, Rod, though their eyes are extremely sensitive, they are powerfully weak in accommodation. The inhabitants on this satellite never have any real light out here. I was using a light so powerful that these unadapted fellows just couldn't see in it at all; we could, after a moment. But the *krull* were totally blinded by it, and suffered acute pain in the bargain. It's not surprising that an animal that depends so on its eyes should be paralyzed when its eyes won't work. When I flashed the light they could not wiggle a muscle, they were so scared. And they couldn't keep the ship invisible, either!"

"Nor," said Blake comfortably, "our food supply."

FORECAST for the NEXT ISSUE

AUDIENCES are tired of our robots," said Von Zorn, head of Nine Planets Films, Inc. "But if we can film the Inferno—on Mars—that's something Gerry Carlyle can't put in her damn Zoo!"

"But the world's greatest scientists say that the Inferno can't be filmed!" Tony Quade protested.

"Exactly!" declared the film chief. "That's why you've got the job!"

How Quade, trouble-shooter and picture-shooter, films his toughest assignment makes interesting reading. HENRY KUTTNER'S new novelet of Hollywood on the Moon, THE STAR PARADE, in our next issue, gives you the latest account of the Solar System's glamour city.

* * *

THE LOOT OF TIME, a prehistoric novelet, brings back an old favorite, CLIFFORD D. SIMAK, to the pages of THRILLING WONDER STORIES. Simak's contribution for the next issue describes the breathless exploits of a group of hunters who traveled into the past for but one reason—so they could find the big game fields in the Riss-Wurm interglacial period. And going back 50,000 years merely for the pleasure of eating a mammoth steak dinner propels our time-travelers into a series of fantastic adventures!

* * *

Lan-Tar had lived all his life on a metal land. Hard, smooth, even metal that stretched for almost 2000 miles in every direction from a central point. For five thousand years it had been so—a metal continent floating over the ocean. Then one day catastrophe came to Metalland. . . . THE METAL OCEAN, a novelet by EANDO BINDER, also in our next issue, is a strange story of Earth's Science Age!

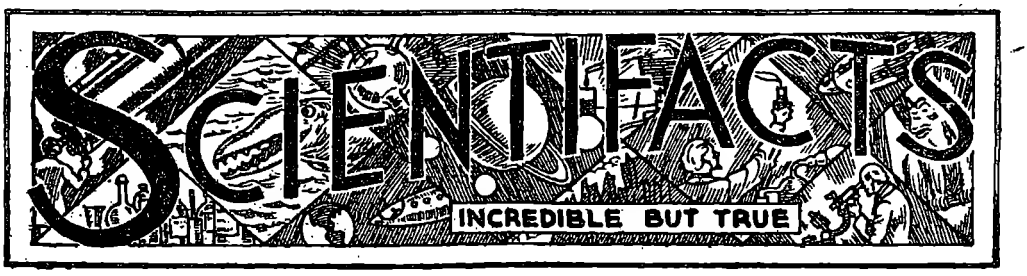
* * *

Stanley G. Weinbaum's interplanetary stories will last forever in the memories of science fiction followers. Recently we learned of a short story Mr. Weinbaum had outlined and begun to write—but never finished. We thought it appropriate to have his sister, who has contributed fiction to our companion magazines, complete this story.

TIDAL MOON, in the next issue, is the result—and we're certain you'll like it.

* * *

All these stories, plus other novelets and short stories by science fiction's most popular authors, are scheduled for the December issue of T. W. S. And there will be many other features . . a new science article by C. P. Mason . . . another SCIENCE QUIZ . . . and all our regular departments.

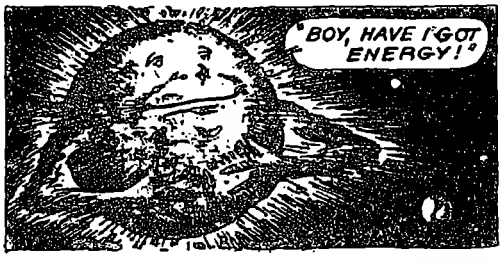


By J. B. WALTER

SOLAR WASTE

THE energy of the sun is so tremendous that to reproduce it would require the burning of 3,000,000,000,000,000,000 (3 quintillion) tons of coal a minute!

Even though the sun sends us 20,000 times as much power as we need, most of it slips through our fingers, merely because we have not yet learned how



to convert sunlight efficiently into those forms of energy which are useful for civilized living.

Whether yesterday was sunny or cloudy, a June day or a day in December, enough energy fell on Earth during that 24 hours to serve humanity for a century—enough to keep the world's furnaces roasting and its refrigerators icy, to spin its wheels and refine its ores, and to fill for a hundred years every other need for power.

Select on a map any convenient desert and look at an area 10 miles wide and 20 miles long. Year after year enough sunlight is lavished on this small sandy waste to satisfy perpetually the power needs of the entire population of the United States at the present rate of power consumption.

EARTH'S RAREST GAS

THOUGH your chemistry-minded friends will insist that the rarest gases known to science are xenon and krypton, you can win bets by claiming it's really some other gas that is most scarce!

A new and hitherto unknown atmospheric gas, a combination of oxygen and nitrogen, exists 10 to 25 miles above the Earth's surface, Drs. Arthur Adel and C. O. Lampland of the Lowell Observatory announce.

It is nitrogen pentoxide, its molecule consisting of one atom of nitrogen and five of oxygen. It is the rarest of gases of the air, present only in the outer regions where the ultra-violet rays of the sunlight bring oxygen and nitrogen into combination with the assistance of ozone.

THE WORLD'S MOST POWERFUL LIGHT

THE beacon on top of the Colgate-Palmolive-Peet Building, Chicago, is rated at 2,000,000 candle-power. To give the light a try-out, arrangements were made to stop the rotation of the beacon, which has served to guide pi-

lots in the Chicago area for seven years, while a United Air Lines plane followed this beam from Chicago.

The passengers were able to read a newspaper by the light of the beacon as far as 27 miles away from the city. Pilots report that the light is frequent-

ly visible 100 miles away and occasionally as far as 140 miles distant.

At one yard from its source, this beacon, the world's most powerful light, is 20,000 times brighter than the noon sunlight at the Earth's surface and eight billion times as bright as a full moon.

THE COSMIC ILLUSION

AN astronomical optical illusion hides the true size of the planet, Pluto!

Pluto, the ninth planet of the sun's family, may be larger in size than now estimated. Sir James Jeans has suggested that this distant planet is so remote and cold that it is covered with a layer of liquid air.

Acting like a mirror, this supercold liquid air would give a minute image of the sun. This is what astronomers see when they observe the planet. The sunlight from the outer portions of the disc would not reach Earth. The apparent brightness of Pluto would give a too conservative idea of its size. A size for Pluto larger than that of the Earth, which might be possible according to this theory, would support the idea that Pluto exercises a noticeable effect on both Neptune and Uranus. This was the basis of the late Prof. W. H. Pickering's prediction of a ninth planet made before Pluto was discovered.

OF MEN AND ATOMS

MAN himself is a walking sample of disintegrating atoms!

Every minute over 500,000 atoms are tearing themselves apart. And at each disintegration, wherever it may occur in the body, rays are sent out which pierce the tissues for a distance of about a fifth of an inch.

One variety of the element, potassium, known as K_{40}, disintegrates within the body at the rate of 600,000 atoms a minute for a man weighing 160 pounds. Of all the chemical elements necessary to sustain life potassium is the only one which is radioactive. Some investigators hold that potassium's radioactivity is the cause of the heart beat.

K_{40} is the "parent" of over 99 percent of all the calcium in the world today. Thus man's teeth and his bones, and those of other animals, owe this debt to the disintegrating potassium element.

OUR WANDERING POLES

EARTH'S magnetic poles are never stationary!

The positions of Earth's magnetic poles are known to be shifting from year to year. Strangely enough, it takes a geophysicist to prove this fact.

Iron minerals in the Atlantic cores tell a story of the wandering of the

magnetic poles. From the evidence now at hand, it seems that the compass pointed in different directions at various times, instead of toward the present north magnetic pole in the Canadian North.

Each particle of magnetic material, as it falls to the sea bottom, turns like a small compass needle, its direction in the sediment showing where the magnetic pole was at the time it fell. From a study of the directions of magnetic particles in the deep sea cores, the wanderings of the magnetic poles through about 200,000 years can be charted. Longer subsea cores will tell us the changes through many more thousands of years.

MORE SCIENTIFACTS in the NEXT ISSUE

MIND OUT OF TIME

Zimel Zoon, a Creature of Pure Thought, Descends from the Universe of Stars in the Form of a Martian Egg!

By
FRANK BELKNAP LONG, JR.

Author of "The Black Vortex," "Invaders from the Outer Suns," etc.

JAMES NELSON, Ph.D., was walking along the beach by the quiet green sea when he saw the curious egg. Nelson was familiar with all the eggs spawned by Mother Ocean —the eggs of sea tortoises and marine invertebrates and even the pinkish, highly translucent eggs of the one snake that lives and breeds in the brine, a formidable, twenty-foot freak from the far-off Indian Ocean.

But never before had he encountered a sea-egg quite as grotesque and extraordinary as the specimen that arrested him in his tracks twenty feet from the long boardwalk.

The boardwalk was crowded with quite ordinary people enjoying themselves in humdrum fashion. Up on the boardwalk were merry-go-rounds and hot-dog stands and nickel-in-the-slot gambling devices that filled James Nelson's fastidious and scholarly soul with measureless contempt.

He had taken a walk by the quiet sea, to escape from all that. A marine biol-

The Universe of Stars had been created to bring order out of chaos

ogist *can* be a thoroughly normal human being, but Nelson was a trifle defective on the human side. He didn't know how to relax and enjoy himself amidst hurdy-gurdy surroundings. It wasn't his fault exactly. He had enjoyed in childhood the dubious advantages of a guarded, strictly private education. He hadn't been allowed to mix with the "rough" lads of the neighborhood.

He had become an intellectual snob almost without his willing it. He couldn't relax even on a picnic. He wore old fashioned standup collars and somber black ties even in hot weather. He called his girl friend the "young lady I'm engaged to" and he thought smoking-car witticisms in bad taste. He was pretty impossible as a rounded human being, but as a scientist he was tops.

The egg appealed to his scientific side. It was right up his alley. It fascinated him so that he forgot his dignity completely. It was resting on the edge of a little rock pool when he saw it. In order to reach it quickly he was compelled to take off his shoes and go wading.

He splashed through the dark, tepid brine, holding his trousers high to keep the cuffs from getting waterlogged. His eyes were shining exultantly when he reached the egg and picked it up.

It was certainly an extraordinary specimen, as palely blue as the summer sky and flecked with little ruby-spots that glistened brightly in the afternoon sunlight. It was large as a tennis ball and heavier than a bar of steel. Something moved inside of it when he turned it slowly about in his fingers.

Trembling with excitement, Nelson thrust it into his pocket, sat down and put on his shoes. Up on the boardwalk a little girl giggled, tugged at her mother's skirt, and pointed at the tall, dignified person who was making a spectacle of himself down on the hot sand. A little crowd of cynically amused people were grinning down at him when he arose, brushed the sand from his clothes, and ascended a long wooden ramp to the hurdy-gurdy world.

Fifteen minutes later he was shut away from that world completely. He sat in a small, quiet room in a small seaside hotel, staring at his incredible new possession and vigorously wringing salt from his trousers. Despite his caution they had seeped up brine at the cuffs.

The egg reposed on a table in front of him, between a pitcher of ice water and a telephone handset. He was regarding it with a sort of inward ecstasy when the phone rang. Impatiently he lifted the receiver and rasped into the mouthpiece.

"What is it, clerk? I told you not to disturb me."

THE voice which answered him was not that of the meek little clerk downstairs. It was the voice of a woman accustomed to getting her own way in matters that were of vital concern to her. And James Nelson was the most vital concern in Anne Maitland's young and eager life.

She wore a diamond which had once belonged to James Nelson's mother on the second finger of her left hand. But that didn't satisfy her any more. She wanted simply a ring with no stones in it—a plain band of platinum. The ring with the diamond in it was getting her down.

"I'm coming up," she said. "There's no reason in the world why you should prolong your vacation. I'm getting fed up with your love of solitude, your pickled specimens. Are they nicer than I am? Why didn't you answer my telegram?"

James Nelson gasped. It was *her* voice, and she was only two flights below him, getting ready to stir up a hornet's nest.

"Wait a minute," he pleaded. "Wait a minute, dear. Don't—"

But Anne Maitland had hung up. With a groan Nelson replaced the receiver and stood for a minute looking mournfully down at the mysterious egg. The sense of wonder, the glow, had vanished completely. The egg would have to wait. With a curse he picked it up, crossed the room and deposited it on a soiled towel in the open drawer of a washstand with rickety legs. He wrapped the towel about it and shut the drawer with a jerk.

Just as he did so there came a knock on the door of his room. Having concealed the egg from Anne Maitland's scornful gaze he felt a little easier in his mind. His fiancée did not appreciate rare and unusual specimens. Natural history was a closed book to her; the glory of science a cinder in her eye.

She came in all flushed and scornful, her rust-colored hair in bobbed disarray; her jaw set in indignant lines. Ninety-nine men out of a hundred would have been thrilled by her hectic loveliness, but to James Nelson she was just an attractive young lady whom he intended eventually to marry. Sometime when he got around to it; when the scientific pressure eased up a bit.

She stirred up the hornet's nest as soon as the door closed behind her.

"This is the last straw, Jim Nelson," she said, her eyes flashing angrily. "You've neglected me steadily and deliberately for three weeks. I wrote you eight times and all I received in reply was a little cold note written in pencil on a card."

James Nelson winced. He hadn't intended to be quite so neglectful. He did care for the girl and when he wasn't putting specimens in formalin or writing essays for the natural science magazines he thought of her a lot. But he just couldn't gush on a postal card; it was undignified, unbecoming.

He started to reply and then, suddenly, his vocal cords congealed. Before he could utter a word the washstand started shaking. It didn't shake violently. The rickety legs just seemed to vibrate and tremble a little while the floorboards creaked.

At first he thought that someone in the room above was moving furniture about or stamping on the floor. But when he strained his gaze in horror he caught nuances of movement which convinced him that the washstand was shaking by itself. It was shaking because something inside of it was moving around and jarring it.

ALL the color drained from Nelson's face, leaving it talcum-white. But Anne Maitland was too angry now to notice the pallor of his cheeks or the curious movements of an article of furniture.

"You're as cold and unemotional as the clammy, dead things you collect on the beach when the tide ebbs," she said. "Don't I mean anything to you at all?"

James Nelson started violently and looked at her as though he were beholding her for the first time. His mouth opened and shut and opened again. But no words came out. He just stood staring at her like a man in the throes of an epileptic aura. A man forewarned and foredoomed, too appalled to speak because of the abyss which was opening out before him.

Then suddenly words poured from his lips.

"Go away," he said. "Leave me. I cannot marry you. You are primitive, unstable. You are biologically unfit to be the mate of a serious and thoughtful man."

His eyes narrowed in critical disdain.

"I'm not even sure that you appeal to me physically. Your nose is too short, and your mouth is too large. I am not an Ubangi, you know. The men of my race have always preferred women with more regular features. You are an anthropological anomaly. Superficially attractive but an anomaly."

Anne Maitland gasped, and recoiled as though she had been dealt a physical blow. Her face flushed and then went swiftly livid with anger. She swayed back against the wall, her jaw muscles working, the fingers of her right hand fumbling with a ring that resisted dislodgment.

"Why you—you beast!" she cried. "So that's what you really think of me. And all the time I was sure you cared. I thought your coldness was just something you were born with, something you couldn't help. Oh God, what a fool I've been—what a blind, incredible fool."

She got the ring off at last. Trembling with anger, she flung it at him. It missed him by a narrow margin and went out through an open window to spin forlornly through the scented dusk. For an instant she stood leaning against the wall, her face scarlet

now with shame and hurt pride. Then she turned and rushed from the room. A full ten seconds after the door closed behind her a strangled sob drifted back through the open transom.

Instantly Nelson covered his face with his hands and swayed groggily backward, upsetting the table where the egg had reposed and sending the water pitcher crashing to the floor. Grasping a bed-post to steady himself he sank dejectedly down on crumpled linen.

Sweat beaded his forehead; his jaw drooped and his eyes were glazed and staring. His face seemed all wrenched apart. Over by the window the washstand was still shaking, but that wasn't what filled him with blind, unreasoning terror.

Something had taken possession of his mind. A perverse demon had entered into him, causing him to think and say things which did violence to his nature.

"I love her," he muttered, in a frenzy of remorse. "I love her more than life itself. Whatever made me talk to her like that. The thoughts—yes, the thoughts were there deep in my mind. All men are critical of the women they love." He groaned. "She has defects, of course—physical and mental. But I should never have told her. I must be mad, or dreaming."

"You are not dreaming," said a shrill, tiny voice.

JAMES NELSON raised his eyes and stared in incredulous horror. The drawer of the washstand had opened and from it there was slowly emerging a flabby, pinkish thing with limbs that writhed and clung to the warped wood while it lifted itself into view.

"I compelled you to tell that woman the truth," said the voice. "Scientific candor is the only justification for the existence of the human race."

Two or three inches above the edge of the drawer a tiny, hairy face, shriveled and hideous, had sprouted from a mass of lumpish flesh and was staring steadily at the appalled man on the bed.

"In three million years your descendants will still be concealing their thoughts, still pretending. But you were the worst, you of the dawn years. You lied about everything."

Little cold eyes bored into Nelson's, chilling him to the core of his being.

"Do not sit there staring. Come and help me from this filthy trough before I am devoured by cockroaches."

Trembling in every limb James Nelson obeyed. He rose from the bed and stumbled across the room to the washstand drawer. Stumbled from the edge of the precipice, stumbled into an abyss of horror.

Swiftly the little blasphemy wrapped itself about his wrist and climbed with shrill bleatings up his arm. Its cold, slimy body made his flesh crawl. A flabby, hairless lump of wet flesh no larger than a pipebowl, it crawled upward on eight spidery limbs that writhed and clung tenaciously.

Its face was batlike—flaring-lipped, shriveled, obscene. As it crawled toward Nelson's shoulder it talked about itself. Talked incessantly. And that was the beginning of the horror.

It was still unborn—a creature of pure thought, an abstraction. A billion billion years would pass away and the Universe of Stars would burn itself out and then Zimel Zoon would be born.

Zimel Zoon. First would come holocaustic millenniums when all the far-flung island nebulae would recede to the outermost rim of space and disintegrate into nothingness. The expanding Universe would cease to expand and the burnt out embers of all the fiery suns of space would trundle the cinders of their dead.

Then there would arise another universe—a universe of thought. From the beginning this second universe had been foreordained. The First Cause which had created the Universe of Stars would create it. In the Universe of Thought the First Cause's mind, diffused throughout a billion glowing facets, would meditate on all that had been and was to be. Zimel Zoon was a facet of that Eternal Mind.

A facet, a glowing pinpoint of eternal mind-stuff in a universe outside

Time, beyond Space. The Universe of Stars, of stupendous forces slowly dwindling over millenniums of time had been created merely to feed the cosmic thought-thirst of these facets.

Something had to be in order that something might survive as thought eternally. Meditation, speculation, eternal dreams that brought eternal ecstasy to eternal mind-facets—because of such everlasting realities the Universe of Stars had been created in the beginning.

IT had been designed originally as a mathematical equation. It had been designed to prove, to test out something that had existed abstractly from the beginning. It was simply a gigantic equation for the thought-facets to muse upon—an equation constructed of primordial wave-stuff that had burst and scattered in the measureless oceans of the Infinite.

In the beginning there had arisen in the First Cause's mind problems which were vague, yet insistent. There was nothing to muse upon, but there was a mysterious discontent astir in the void. A disputed point had to be settled, a great doubt resolved. The Universe of Stars had been created to bring order out of chaos; to test a theory in the Cosmic Mind.

Across the cosmic wastes a stupendous dynamic had moved, agitating the space-time continuum till it flowered in mighty islands of flame. Flowered gigantically and then—refused to balance. Refused to satisfy the mysterious, primordial need for order and fulfillment of thought. Into it there crept discordant elements—by-products irritating and outrageous. Man.

On a tiny planet, Earth, encircling a minor sun near the center of the stupendous structure, there arose shapes plastic and squirmy, jelly-flecks that impeded the vast equation's solution. Jelly-flecks that clung like leeches to the First Cause's directing mind and sucked into their being faint glimmerings of the mind-stuff which had fashioned the Universe of Stars.

Into a resolving and expanding Universe which was running down like a clock, amidst energies vast and terrible, amidst physical abstractions that burned and glowed and shivered in the twin wombs of Time and Space, the human race emerged to challenge the First Cause's experimental design.

Despite that challenge the Universe of Stars would pass away. It would pass away and become a dream for the mind-facets to muse upon. A dream that solved nothing, an equation botched in the making.

Yet because of it the mind-facets in the Universe of Thought would experience all the ecstasies of pure speculation forever. The mind-facets would muse eternally on a great and baffling mystery. A little race of bipeds on the planet Earth had stolen something of the eternal fire and botched the great equation. Why? How? It was an eternal mystery, a never-ending source of speculation and delight.

Zimel Zoon, dreaming in that far-off, still unborn world, was enraptured by that problem. Throughout an eternity in a timeless universe he dreamed about the human race. Being a facet of the First Cause he remembered all that had been and was to be. He remembered the human race in its heyday, remembered how it had perished dismally in its pride.

How horribly the little bipeds had parodied the sublime thought-processes of the First Cause's mind. How spiteful, selfish, depraved they had been. How ungrateful, how blood thirsty, how cruel, how mean, how petty, how vengeful. What liars they had been, what deceivers. It was impossible to dream about them without getting angry, without becoming furious.

The lies they told were horrible. They were capable of limitless hypocrisy and self-deception. They lied to one another at all hours of the day and night, scarcely ever told the full, merciless truth. And there was no reason for it, no reason at all. Even when they mated they told lies.

A MAN looked at a woman and said: "You are beautiful, you have lovely eyes." But in his mind he thought: "She is beautiful, yes. She appeals to me very much. But she has a mean disposition and a mole on her

left cheeks which annoys me. I am a fool to love her the way I do."

The worst thing about them was their hypocrisy. Why couldn't they tell the truth; why couldn't they be honest with themselves?

Brooding in the timeless world of thought Zimel Zoon reasoned as follows:

"The human race emerged against the express design of the First Cause. It emerged unbidden into a world of abstract design, of mathematically precise energy-patterns. It was out of place in that world. It botched the equation; spoiled everything. But it *did* break through.

"Why could not I, an abstraction, break through into the physical world? Why could I not travel backward through timeless eternities and enter the human world where everything is unstable and capricious?

Why could I not become a part of that quivering jelly-world, that protoplasmic world that defied the disrupting nebulae?

"Of course I would not be able to take a human form. Human beings were too complex. But there were other animal forms with complex vocal organs and exceptional powers of survival.

"Why could I not project myself into the physical Universe, into that great equation which has passed away, and enter the egg of a Martian Chatz bird. I am a facet of the First Cause which created the Universe of Stars. I can agitate space with the First Cause's dynamic.

"With my powers I could easily enough bend the space-time continuum a little and warp that egg into the gravity field of Earth at a definite period in human development—say the twentieth century. It would be wonderful to study the human race at first hand, in its early stages of development."

All this and more Zimel Zoon confided to James Nelson as it clung loathsomely to his shaking arm and stared up intently into his white, terrified face.

"My appearance repels you," it said, "because the Martian Chatz bird is structurally akin to the reptilian fauna of Earth. But cosmically speaking, I have entered your world in a very beautiful form. Utility and beauty go hand in hand throughout all nature and the Chatz bird is a miracle of adaptation. It has been conditioned to survive the ghastly rigors of the Martian winter. It can absorb mineral nourishment and is almost indestructible. Ordinary heat and cold will not affect it, and if it is injured in any way—if it is cut or mangled—the damaged parts will drop off and new ones grow out and replace them."

Nelson began to shiver all over. He felt that he was very ill, that his mind was in a dangerous state. He had a feeling of oppression in his chest and in the front part of his head. A feeling of weight, of heaviness.

It alarmed him because he was subject to nervous attacks that simulated epilepsy. They were not serious and only lasted a few minutes, but if the strain became too great—

The little horror seemed to sense what was passing through his mind.

"I can see that my appearance has terrified you and given you a nervous chill," it said. "That is regrettable. I suggest you go out and walk by the sea. Look at the great, calm ocean—put me completely out of your thoughts for a few moments.

"Then return and we will discuss our life together."

"Our life—together!" gasped Nelson, an icy chill racing up his spine.

"Yes, of course. I will never leave you. Until you die I will travel about with you and compel you to speak the truth."

JAMES NELSON swayed dizzily. His knees buckled and he was compelled to grasp the edge of the washstand to keep from falling. Slowly Zimel Zoon squirmed down his arm again, dropped back into the drawer.

"A disgusting trough," it said. "But I will remain here until you return. I have a sentimental regard for this drawer, filthy as it is. I was hatched here; it is my birthplace in the physical world."

Nelson passed a shaking hand across his brow. "I—I couldn't stand it," he said. "Not until I die. The truth is a

terrible thing. I couldn't hurt people that way."

Zimel Zoon's little cold eyes stared up unmercifully.

"Nonsense," it said. "You will get used to it. I will guide your thoughts as I did a moment ago, herd them into pathways of truth."

"I will kill myself," said Nelson, in a despairing, hollow voice that hardly rose above a whisper. "If you do that to me I will kill myself as surely as I stand here talking to you."

"Nonsense," reiterated Zimel Zoon. "Go out and look at the sea. Night is falling. The sea should be very lovely in the moonlight. Look up at all the stars of heaven. The sea and the sky will humble your pride and cleanse your soul of juvenile vanities."

"I will kill myself," muttered Nelson wildly.

"No, you will not," said Zimel Zoon. "I can control your thoughts even when you are not beside me. You will go out now and walk on the beach. That is my wish, my command. While you are on the beach you will scoop up a little sand, and bring it to me in your handkerchief. I am ravenously hungry."

"I will not go," Nelson said.

Zimel Zoon's little cold eyes flickered curiously. Into Nelson's mind there crept a tremulous indecision, a wavering of his will.

"I must not go," he muttered, an agony of despair.

"*Go now*," said Zimel Zoon.

With a strangled sob James Nelson turned from the washstand and walked with slow, tottering steps out of the room.

The half hour which followed was a continuous, ghastly nightmare to Nelson. He walked swayingly in the moonlight on wet and gleaming sands while vast, shadowy terrors thronged the corridors of his consciousness. Neither the quiet and star-mirroring sea or the revelry of merrymakers on the long boardwalk could bring forgetfulness or free him from the hideous compulsion which rested upon him. Insistently in his ear a voice droned: "You must return, must return, must return and feed me. Scoop up a little sand, return to the hotel."

At first his mind was too numbed by horror to bestir itself aggressively in defense of the only thing that he valued more than life itself. But gradually as the cool breezes from the Atlantic swept over him his feverish faculties cleared a little and he found himself thinking grim, desperate thoughts which went counter to all the counsels of the mysterious voice which droned in his ear.

All at once he knew what he must do. For an instant the sheer audacity of the plan jolted him like a high-voltage wire, and stopped him abruptly in his tracks. His face whitened and his heart began a furious pounding.

Beside the silent sea there was a roaring in his ears. A roaring vibrant and persistent, as though a voice were shouting at him in the still night: "Courage. You must resist now before it is too late."

It was not the little, sinister voice. It was the voice of something primitive and splendid in him, rising suddenly from his dark subconscious and releasing undreamed of energies in the depths of his being.

THE haunted look vanished from his face. He turned swiftly and swept his gaze along the glimmering boardwalk. Less than a hundred feet from where he was standing lights shone in globular clusters. Toward this garish carnival-glow he moved, his face set in grim lines.

The light streamed down on his baggy trousers and tousled hair as he ascended the ramp in swift, resolute strides. Across the boardwalk he moved, jostling merrymakers in fools'-caps and snaring confetti with his clothes. He encircled a lighted merry-go-round, passed between rival shooting galleries where lighted ducks dived and cavorted amidst wooden waves and entered an arcade aglow with neon signs and so crowded that he had to fight his way toward the drugstore at its southern end.

The little, sleepy-eyed clerk behind the drug counter merely blinked at him when he passed into the store. Over by the soft drink fountain a three-hundred pound nymph in a bath-

ing suit was making oogle eyes at a handsome soda jerker who kidded outrageously as he dispensed his syrupy fare. But the drug counter was as deserted and dismal as a tomb.

As Nelson advanced swiftly toward him the clerk straightened and pushed aside the arms of Morpheus.

"Yes, sir," he said, courteously. "What is it you wish?"

"I would like—" Nelson hesitated the fraction of an instant. "I would like a small bottle of nitro-benzine."

The clerk gasped, and gazed at Nelson as though he were confronting, for the first time in his drab, conventional life, a mass murderer in the flesh.

"But we can't sell that to just anyone, sir," he stammered.

"I'm not just anyone," said Nelson. He reached in his pocket and ripped out letters, telegrams. He identified himself as an important person. More important, a scientific person. A practicing biologist who used in his work all kinds of unusual drugs and preservatives.

The clerk was impressed.

"If you'll sign for it in our poison book, sir—"

"Of course I'll sign."

"Very well, sir. But I suppose you know what one drop of that stuff will do if you spill it?"

"I know," said Nelson, grimly.

Fifteen minutes later James Nelson ascended in an elevator to the second floor of the Sea Vista Hotel, walked quietly down a plush-carpeted corridor and opened the door of his room. There was a look on his face when he shut that door behind him which would have startled anyone familiar with the psychology of men who slay. For once in his mild-mannered life James Nelson was potentially red in tooth and claw, a killer.

He moved silently across the room. The drawer of the washstand was open. Behind it a faint breeze blew in through the open window, stirring flimsy curtains.

Standing as rigid as a corpse, Nelson looked intently down at Zimel Zoon, who was staring too. Apparently Zimel Zoon had been asleep. Slowly it opened slumber-filled eyes and gazed inquiringly up at the white, set face of the man who loomed in shadows above it.

"Why did you stop at the drugstore?" it said.

Nelson felt his spine congeal. But there was nothing but truth in him now. Nothing but a burning desire to speak the truth and slay the thing that would have him speak it always.

"I am going to kill you," he said. As he uncorked and raised the bottle his fingers trembled a little, but they were competent and swift enough. From the mouth of the bottle liquid death descended in a spattering stream on the hideous shape in the drawer.

The shape squirmed agonizingly as the lethal and corrosive chemical spread over its pinkish flesh. It went livid all over and twisted itself into convulsive knots.

BUT Zimel Zoon's voice was as calm as ever.

"I feel no pain," said Zimel Zoon. "You poor, deluded fool. Did you think that this body was important to me? For a little while I would have lingered in it, studying you as you study specimens under glass. A few days perhaps—no longer. But when you came in just now with your poison a great weariness enveloped me. I was asleep and dreaming and in my dreams I saw you as you are.

"Loathsome blebs of jellystuff under the clean stars. You defied the First Cause and botched the Great Equation. But consider. A few scattered grains of sand thrown into a vast and intricate machine would arrest its sublime functioning. You and your kind are merely clogging grains of sand in the vast superstructure of the Universe of Stars. I thought to shame and change you by threatening to remain with you always. But now I realize you are not worth saving."

The little shriveled face was leprous and corroded now. It twitched convulsively.

"Do you realize what you have done? You have destroyed in Earth-time a creature not yet born. In thousands of years the Chatz birds will nest and breed in the Martian polar wastes. But

as yet there are no Chatz birds on Mars.

"When this body dies it will slip back along the space-time warp to its birthplace in the future. It will slip back to Mars, creating an ether-strain. A small segment of the space-time continuum will buckle into folds. There will be an explosion!"

Slowly a whitish film spread over the dying creature's eyes. Nelson started violently and retreated from the drawer in sudden, wild alarm. Into his face had come a look of incredulous horror.

"You will be injured, perhaps killed," said Zimel Zoon, in a voice so faint it was like a whisper from the grave. "I cannot save you. Good-by, James Nel—"

Zimel Zoon's voice was drowned out in a deafening blast of sound. All about Nelson there was a crackling thunder-roar, a crash as of colliding worlds. The floor tilted crazily and rose on swift, invisible wings through tiers of darkness laced with flame.

Nelson felt himself ascending with the floor, cometing erratically upward through light-streaked blackness till a blinding radiance suffused all space about him.

His faculties expanded until they seemed to embrace the Universe of Stars. He was the great abyss and all the flaming suns of space were merely facets of his all-embracing mind.

The titan glow diminished as swiftly as it had arisen. The abyss dwindled and his faculties contracted till only a wavering pinpoint of light remained glowing in the depths of his brain. Then it too went out.

Consciousness returned to James Nelson in slow, painful stages. He didn't realize at first that he was in a hospital. He couldn't see very well and everything was obscure and wavering. He seemed to be at the bottom of a deep, dark well looking up at something white that moved tremulously across his vision.

Then his faculties steadied a little and he perceived that the white blur was a human face. The pale oval of a face—a woman's face. Finally the mists cleared away completely and he recognized the woman who was bending above him.

It was Anne Maitland. Tears glistened on her pale cheeks and long, dark lashes, and her eyes were luminous with tenderness and concern.

"Oh, my darling," she murmured. "I should have known that you didn't mean one word of what you said this afternoon. I should have known."

Nelson's hand went out waveringly and clasped her slender fingers.

"What happened, dear," he murmured. "How did I get here?"

Anne Maitland was weeping softly.

"When you thought you'd lost me and tried to kill yourself," she murmured, between sobs. "With that chemical—whatever it was—there was a frightful explosion. I know you planned it that way, to make it look like an accident. And all the time I thought you were cold, indifferent—that you didn't care at all."

Nelson closed his eyes and sank back with a sigh. His fingers moved up her arm and gently caressed her throat and cheeks. When he was well again there was one thing he would do. He would buy her orchids—bushel-baskets of orchids. And he would talk to her about moonlight and roses. And some day perhaps—when he was quite well and they were safely married—he would tell her about Zimel Zoon.

O

WATCH FOR THE TENTH ANNIVERSARY

ISSUE OF

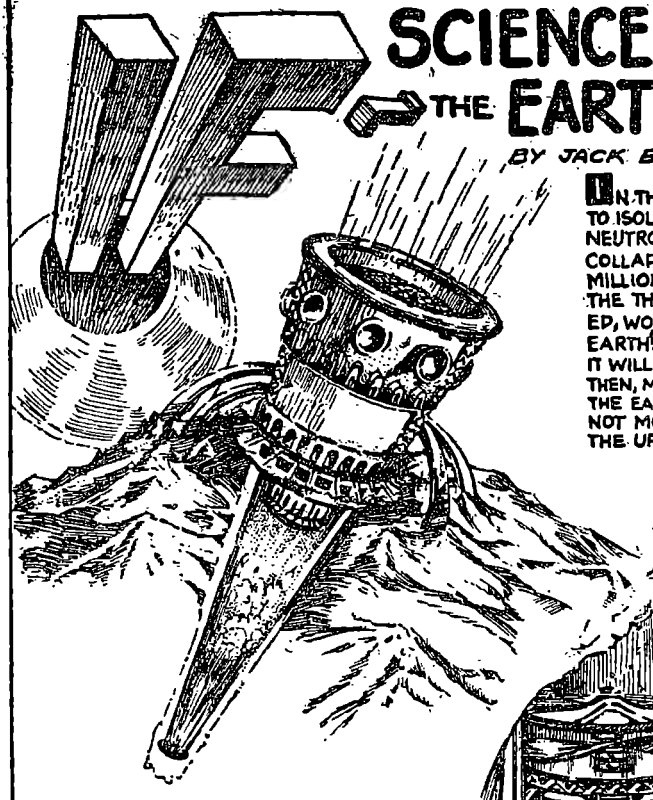
THRILLING WONDER STORIES

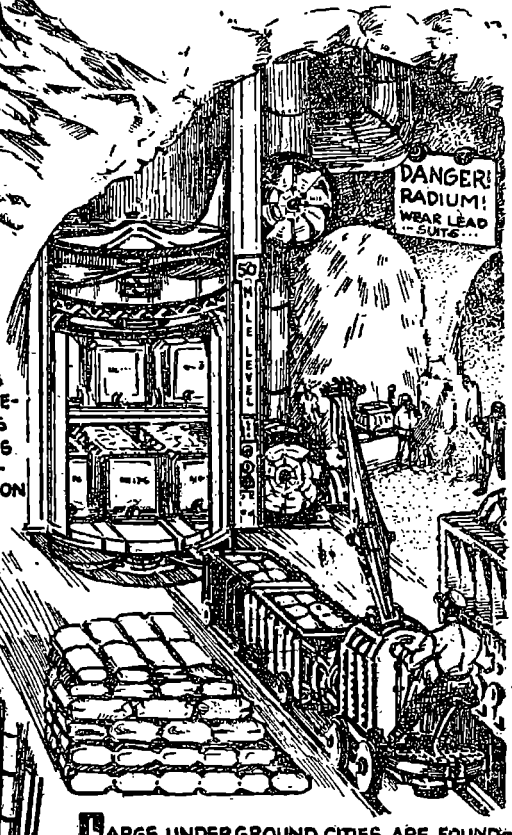
COMING SOON!

IF SCIENCE REACHED THE EARTH'S CORE!

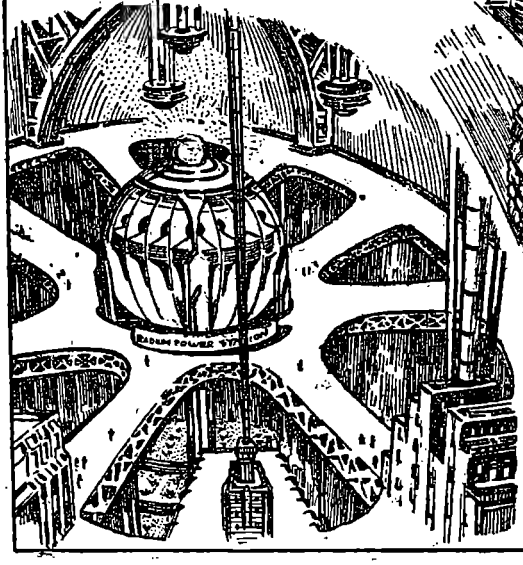
BY JACK BINDER

IN THE FUTURE, SCIENTISTS WILL BE ABLE TO ISOLATE OR CREATE THE ELEMENT NEUTRONIUM. NEUTRONIUM, COMPOSED OF COLLAPSED ATOMS, WOULD WEIGH SIXTY MILLION TONS PER CUBIC INCH. EVEN THE THINNEST DISC OF IT, WHEN RELEASED, WOULD BE ABLE TO PENETRATE TO THE EARTH'S CORE. IN THE WORLD OF TOMORROW IT WILL BE USED TO BORE LARGE SHAFTS. THEN, MAN DESCENDS TO THE CENTER OF THE EARTH AND FINDS THAT THE CORE IS NOT MOLTEN. RADIO-ACTIVE MATTER IN THE UPPER CRUST GAVE THE ILLUSION OF INNER HEAT!





EARTH'S FIFTY MILE CRUST, NOW AVAILABLE, IS A TREASURE CHEST OF METALS AND GEMS. CAGE-LIFTS FROM THESE MINES BRING UP LIMITLESS QUANTITIES OF ORES. THE SURFACE REFINERIES ROAR DAY AND NIGHT WITH ACTIVITY. GOLD, RADIUM AND PLATINUM ARE COMMON. CIVILIZATION IS NO LONGER METAL-STARVED.



LARGE UNDERGROUND CITIES ARE FOUNDED. CHEAP RADIUM GIVES LIGHT AND POWER. ULTRA-VIOLET RADIATION SUBSTITUTES FOR SUNLIGHT. INTENSIVE CULTIVATION YIELDS FOOD. THE WORLD'S EVER-CROWDED SURFACE HAS A NEW OUTLET FOR ITS SURPLUS POPULATION. MANY PEOPLE PREFER THE SUB-SURFACE LIFE FOR ITS UNIFORM "WEATHER."

Next Issue: IF YOU

A NEW MODE OF TRAVEL ARISES— VIA EARTH'S CORE! SHAFTS FROM EVERY IMPORTANT LAND PENETRATE TO A COMMON CENTER. THE TRIP FROM CHINA TO AMERICA, FORMERLY 12,000 MILES, IS REDUCED TO 8,000 MILES. THE COST IN POWER IS STILL LESS, BECAUSE FOR HALF THE DISTANCE GRAVITY DOES THE WORK!
TO BOW OF SHIP
—HONGKONG— EXPRESS GONE DUE
HANDS OFF PLEASE
SPEED OF FREE-FALL
TO STERN OF SHIP
HANDS OFF PLEASE
SPACE TRAVEL IS SOLVED. STARTING AT THE ZERO-GRAVITY OF EARTH'S CORE, ACCUMULATIVE ACCELERATION, IS EASILY BUILT UP IN A FOUR-THOUSAND-MILE TUBE. THE SHIPS REACH EARTH'S SURFACE WHERE GRAVITATION IS STRONGEST WITH AN APPRECIABLE VELOCITY THAT MAKES THE TAKE-OFF A SIMPLE PROCESS OF CONTINUATION!
EARTH'S EXACT CENTER, HOLLOWED OUT, HOUSES A GIANT RESORT AND SANITORIUM. HERE THE FORCE OF GRAVITY IS ZERO. VACATIONERS ENJOY THE THRILL OF BEING WEIGHTLESS. INVALIDS FIND A NEW STRENGTH, UNTAXED BY THE STRAIN OF GRAVITATION. MANKIND DISCOVERS A NEW WAY OF LIVING FOUR THOUSAND MILES BELOW EARTH'S SURFACE!

WERE STRANDED IN TIME!

The MAN WHO SAW TOO MUCH

A "Tubby" Story

By RAY CUMMINGS

Author of "The Space-Time-Size Machine," "Around the Universe," etc.

"That's a man from the fourth dimension!"

"WELL, that ain't so," Tubby declared. "I can see swell with one eye. Not so far to the sides, maybe, but what I do see is all to the good."

"I'm only tellin' you what *he* said," Jake defended. "He said that with one eye you see everything flat. Just two dimensions. He said, just like as if the scene was a painted picture."

"That's right," the second man agreed. "That's what he said."

"An' furthermore, an' in addition," Jake insisted, "he said optics is a wonderful thing. He said your two eyes has to be used to see the third dimension. He says each eye sees something different from the other."

"'Taint so," Tubby said doggedly. "You're a fool, Jake. The man who said that is a fool. Why, look here—"

Tubby took one of his fat hands from the steering wheel of the car he was driving, and waved it expansively at the backward-sliding night scene disclosed by the automobile headlights. The three of them were crowded into the single seat of Tubby's little roadster, speedily heading north a few miles outside of Fort Knox, Kentucky.

"You see them trees?" Tubby demanded.

Both his companions admitted that they saw the trees.

"Well, look at them with one eye—your right eye. Close your left one." Tubby suited the action to the word, and waved his hand again at the trees. "Now look with your left eye—close your right one like I'm doing. Don't them trees look the same? I ask you—"

"Hey, Tubby, look out!" Jake squealed.

Tubby saw distinctly—with one or both eyes, he never knew—that things were happening. Both his friends

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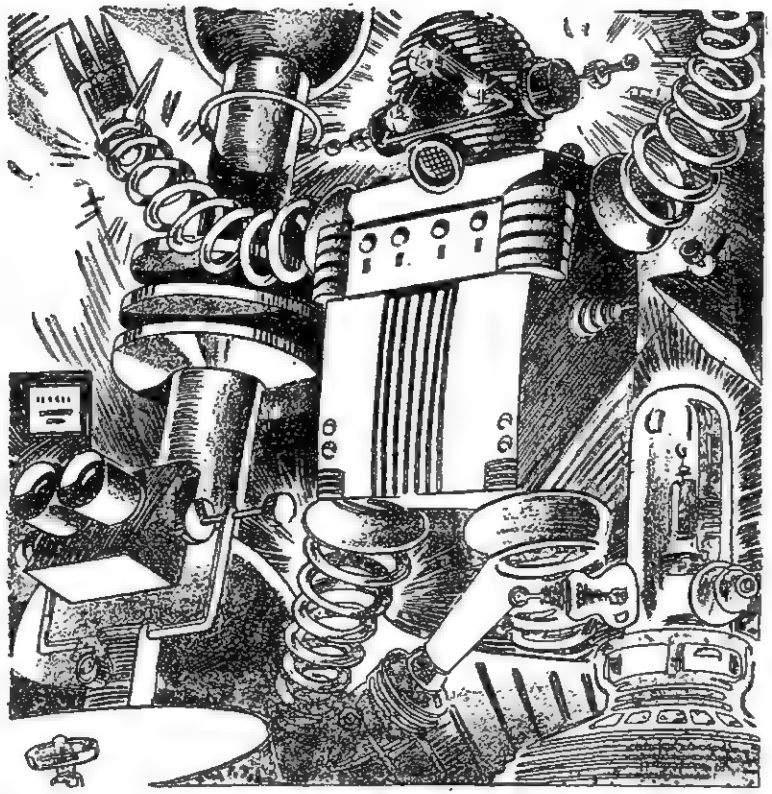


helped him grab the wheel to get the car back on the road. But too many hands were worse than none. A lot of disastrous things happened almost all at once, the last of which was that a tree was trying to slice the car in half, beginning at the radiator.

HOW long he remained unconscious Tubby had no idea. He was pretty sure he was dead. He tried to open his eyes, but only one eye really came open because the other one had bumped against something and was badly swollen.

Where were Jake and Pete? Feebly he called, but there was no answer. The car wreckage was half over him. With all his strength he heaved it off. Then his blinking one good eye was aware of a blinding headlight. He heard a grind of brakes—a passing car, stopping on the road.

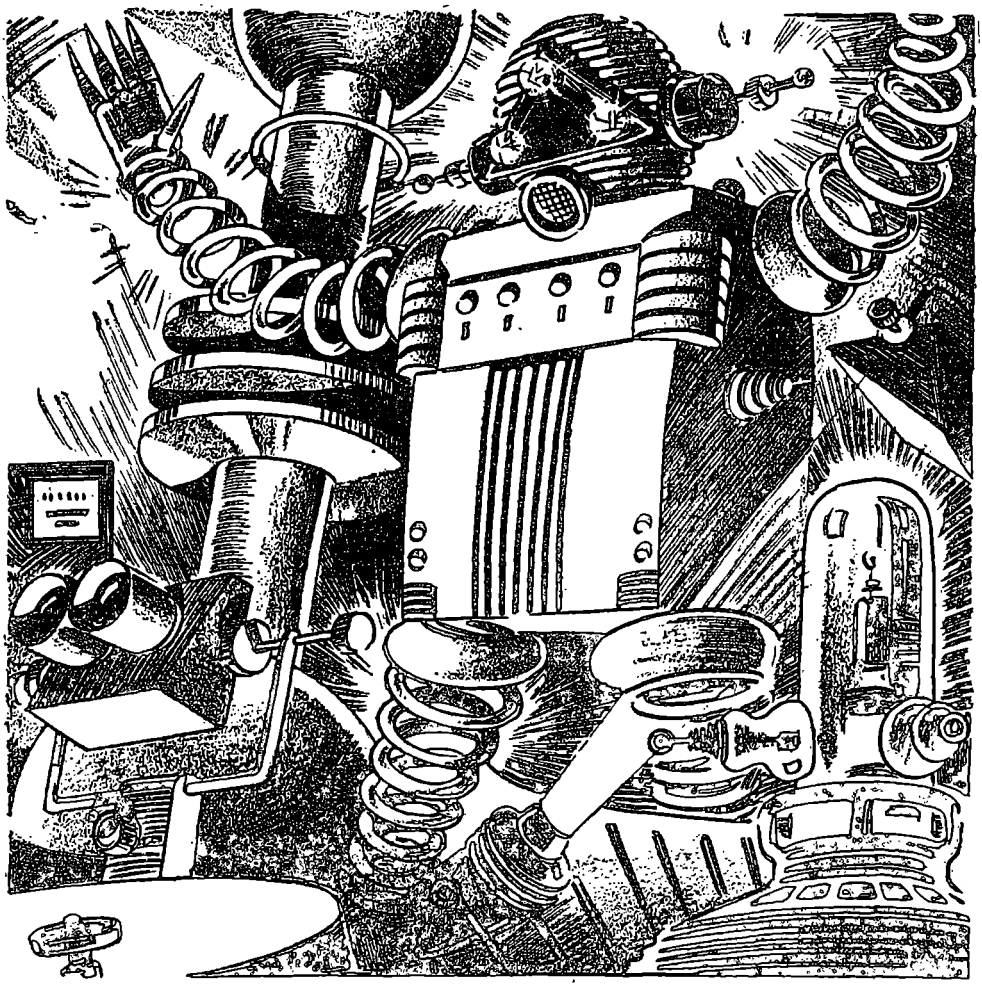
A man's figure stood over him.

"Oh," the man said. "So you're alive?"

"Sure, I'm alive." Tubby struggled to his feet, the stranger helping him. He was a very extraordinary looking man, enormously tall and very thin, with a long frock coat and black plug hat that made him look even taller and thinner.

"Thanks," Tubby panted. "I had two friends with me—"

The stranger poked over the wreckage with a flashlight. "I guess somebody else rescued them," he said. "You



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must have been buried, and they missed you."

"I was." Then abruptly Tubby saw the stranger's face for the first time. It was long and thin and very sad. But most remarkable of all, the man had three eyes! Two were normal eyes—sad and solemn as they stared down at Tubby. The third eye was in the middle of his forehead, right over his nose. Its lid was down, as though that much of the man were peacefully sleeping.

"Oh—" Tubby gasped. But he knew it wouldn't be polite to notice such a deformity, so he raised a hand to his swollen left eye. "Guess I'm all right, only something hit my eye," he mumbled.

The stranger brightened. His third eye stayed shut, but the other two sparkled with delight.

"An eye injury!" he exclaimed. "I'll take you to my laboratory. It's the finest eye laboratory in the world."

"Much obliged," Tubby said. "What's your name?"

"Professor Syte," the man said. "I'm an eye expert."

"Mine's Tubby. Pleased to meet you."

Cordially they shook hands. Soon they were in the professor's car, speeding toward Fort Knox. For a long time they sat in silence.

"You know all about eyes," Tubby said finally. "Am I right?"

The professor sighed.

"Yes—but it's all I do know," he said. "I've been studying optics so long. I've neglected everything else. It's horrible."

The professor's car was rolling along the city streets now. A large building was just ahead. The professor gulped as he gazed at it.

"That's the government's new gold depository. Greatest vaults in the world."

Tubby, with his one good eye, took another look.

"The place where they got all the gold in the world?" he asked.

The professor's smile was very wistful. "Well, not all the gold, but a lot. Big piles of yellow coins—golden ingots—fabulous wealth—" His voice, with tears in it, trailed away.

Big piles of yellow coins . . . golden ingots . . . Tubby stared at the blank walls, the barred windows, the guarded doors.

"Sure would be nice to get a look at that money," he said. "I ain't so dumb—seems like as if I could just see it, I could figure a way of gettin' it."

As though galvanized, the professor ran his car to the curb, stopped it, and was gripping Tubby.

"You mean that?" he hissed.

"Mean what?"

"If you could *see* the gold you could get it! That's my problem. I can see anything. I know all about optics—I've mastered everything about the science of vision!"

"You mean you can see them ingots?"

"Certainly! Come to my laboratory and I'll show you how we can get that gold for ourselves."

THE professor's laboratory was a big, dim room littered with a mass of scientific apparatus. He pressed a row of wall switches and at once lights sprang from a dozen hidden sources—horizontal beams like little searchlights—red spots of glow—weird violet puffs that oscillated and winked on and off. The dimness sprang into a dazzling glare; but Tubby's good eye showed him a long table piled with all varieties of lenses.

Shelves with bottles lined the walls. In a corner there was a large glass cabinet filled with surgical instruments. And in the middle of the room there was a gruesome slablike operating table.

The professor cast an appreciative glance around the room.

"My workshop," he said. "There is only one complete master optical laboratory in the world, and this is it. Sit down, Tubby. We must hurry."

"Because we're gonna get that gold, we sure got to hurry," Tubby agreed.

The professor was hurrying. He brought a basin, with a sponge and a fluid in it.

"You've only got one-eye vision now," he said. "Everything looks flat. You don't realize it, because you're used to judging things by their perspective and their size. But in reality, you are gazing at a world of only two

dimensions."

"Are you sure?" Tubby asked dubiously. "I was tellin' my friends—"

"Of course I'm sure." The professor set down the basin. "Now here are two new lead pencils," he said. He held them behind him. "Close your good eye. Now I'm standing the pencils upright, in little holes of the floor. Open your eye. Tell me which pencil is closer to you."

Tubby, with his one good eye, stared at the pencils. One was red; the other was yellow. The red one seemed much nearer than the other. He said so.

The professor smiled triumphantly. "Wait until I fix your other eye," he said.

Swiftly, deftly, he dabbed the swollen eye with the sponge. The lotion was very swift-acting. In a few seconds the swelling and the pain vanished.

"There—you're all right now," the professor said. "That's my Rapid Relief for Injured Optics. It's a good lotion—*I* invented it. Open the eye, Tubby. Look at those pencils with both eyes."

Tubby looked, then gasped. With one eye he had assumed that the pencils were both the same size. But they weren't. The red one was very much bigger. And it wasn't closer; it was further away.

"You couldn't see depth with one eye," the professor said. "But now, with two eyes—one eye sees a little of the left-hand side of the pencils. The other sees on the right side a little. Two different images—because your eyes look from different viewpoints. And the two different images blend in your brain and give you a perception of the third dimension. Depth of field. Our world, you know, is a world of three dimensions."

"We're gonna get rich," Tubby reminded him. "Am I right?"

"My goodness, yes. You're always right. I'd forgotten. We'll get right at it now."

Wouldn't the professor's third eye ever open, Tubby wondered. Though his two normal eyes were shining with eagerness, that third eye still stayed shut. He was at the operating table now, adjusting it; then he went to the big glass cabinet, selected little hammers, saws and knives.

"WHAT do we do now?" Tubby asked in alarm.

"I can see everything, Tubby. Seeing things is my specialty. I'm going to give you a third eye—like mine. Then you'll see everything too."

"Oh—thanks." Tubby stood up. "I guess I better be going, Professor. I ain't so awful interested in—"

"Gold?" the professor said. "Not interested in gold—fabulous wealth? Why, this little operation of mine won't hurt you, Tubby. I'm a master at such things."

Soothingly he drew Tubby to the operating table; pressed him down. "There now," he said, "it'll all be fixed in a minute."

Piles of gold coins. . . . Huge bars of solid gold. Tubby kept his mind on them. . . The pounding little hammer at his forehead, chipping away the bone, didn't hurt, but it was very unpleasant. At intervals the professor dabbed on a lotion to check the flow of blood.

"There—so far so good," he said cheerfully. "Now for an eyeball." The optical expert searched his shelves for a moment. "Here's a good match," he suddenly exclaimed. "Color and size and type—just right." Holding the eyeball gingerly with a pair of padded forceps, skillfully he pressed it into the socket in Tubby's forehead; fitted on its eyelid. "Now—easy—don't move—it takes great delicacy to connect the optic nerves."

But it was done in a moment.

"Now," the professor cautioned, "keep your third eye closed, Tubby."

"Right," Tubby agreed. "That wasn't so hard. We did that pretty snappy, didn't we?"

With his two regular eyes he watched while the professor switched out all the lights in the room. Through a window the illuminated street was visible, with the vaults diagonally across it.

"Open your third eye now," the professor said. His voice trembled with emotion.

Tubby opened his new eye—stared with all three of his eyes. At first there

was only a dim grayness, as though he were in the midst of a heavy fog. Then it cleared a little. He could still see the very dim laboratory, the window, the lighted pavement outside, and the gold depository across the street. But they were all blurred, ghostly outlines now. And mingled with them, he was seeing other things, things that were much more real.

Trees were here in the shadowy laboratory room. Other trees straggled down a grassy slope to a little glowing brook. There was a bridge over it; and then another descending slope. The dim ghostly outlines of the vault were all tangled up with that distant grassy slope.

"With two eyes," the professor's voice was saying, "we perceive our normal world of three dimensions. With three eyes we see—the world of the fourth dimension! A different state of matter—a whole new realm. And there it is—occupying the same space as our world."

Tubby stared breathlessly. It was wonderfully scientific. And certainly it was real. The laboratory, the street and the mint were still here—vague and shadowy as though they had all been changed into ghosts.

"We sure are seein' plenty," Tubby said. "What's that yellow light over there?"

It was a dim yellow glow, all ghostly.

"That's in the vaults of the place!" the professor said excitedly. "I told you I could see everything. That's the gold we're after."

GREAT shadowy piles of gold coins . . . huge stacked ingots of gold. There they were, plain to be seen. Almost half the gold in the world. It shone wraithlike. But it was there.

"Swell," Tubby said. "The idea is to go get it. Come on."

He started down the grassy slope. But something was wrong. His feet didn't connect with the slope. The professor shouted a warning, but before Tubby could heed it he walked smack against the wall of the laboratory.

"Oh dear," the professor wailed. "Did you hurt yourself?"

Tubby shook his head. It was terribly confusing. The descending grassy slope looked so real, and the laboratory wall seemed so nebulous he half thought he could walk right through it.

"Our vision is in the fourth dimension," the professor said. Tragedy was in his voice. "But our bodies are still in our own world. That's the pathetic part, Tubby. That's what has almost wrecked my mind—seeing that gold and not being able to get to it."

Tubby stood blinking. It was horribly tantalizing.

"That's what you're supposed to do, Tubby. You've got the scientific mind. You get us in there."

"Sure," Tubby said weakly. "That's my job." But how could he get them in there? "Look, Professor," he added, "there's something moving down there."

It was a giant upright thing, about seven feet tall. Metal wires motivated it. It had a body that was a bulging rectangle, like two warped automobile radiators soldered together. And on top there was a cylindrical wire coil, like a head.

The thing had a sort of face. There was a wire mesh there, with a disc like a mouth; ears at the sides, like microphones; and a triangle of three glowing eyes. The whole thing glowed as it moved with a springy, bouncing step. And it was lighted; the wires all rippled with darting light, like the moving lights on a theater marquee.

"My gosh, what is it, Professor?" Tubby gasped.

"An inhabitant of the fourth dimension," the professor said. "Look! He's coming this way."

The metal man was only a few feet from them now. He was standing on the slope, partly below the shadowy level of the laboratory floor. All his three eyes were winking with a violet light as he stared at Tubby and the professor.

"If we only knew whether he has intelligence," the professor was murmuring.

"He's talkin'," Tubby said. "I can see his lips moving. If he's smart he can talk English. But we can't hear him and he can't hear us."

"My gosh, he's talkin' English, an' I

can lip-read!" Tubby suddenly exclaimed. "I learned it in a deaf an' dumb asylum where my brother works. Stand back, Professor. I'll handle this." Tubby was absolutely masterful. "You want me to help you get rich," he added. "Well, that's easy. Just watch me."

It was a grand idea. And it worked to perfection. The metal man had a very great intelligence indeed. He could speak English, and he could also lip-read.

"We want to come in," Tubby said, moving his lips carefully. "You there, come out an' get us an' take us in."

"I don't want to bother," the metal man said.

"We'll make you rich," Tubby urged. "We'll give you almost half the money in the world."

THE metal man pondered it; from head to foot he quivered. "Money?" he echoed. "What's money?"

"Money," Tubby said, "why—why money is what makes you rich."

"Rich? What's that? And why should I want to be it?" the metal man countered.

"Gold," the professor put in. "A yellow metal. One of the elements. It's amazingly ductile. Durable. It has an atomic weight of—"

"A durable metal?" The metal man brightened, with all his wires glowing more intensely. "A ductile metal—you could draw it out into very fine wires?"

"Sure—sure," Tubby agreed. "You could do anything you want to with it."

Again the wire-man pondered. Then he seemed to reach a decision. "Well —" he said.

"He'll help us!" Tubby whispered to the professor.

"I will be right back," the metal man said. "You wait there." He raced away down the slope.

He was back a few minutes later. He had changed his appearance quite a bit. A lot of extra wires were mingled with him. The new wires seemed to compose a gadget like a wire grid that was fastened to his chest, with strands running down his legs and arms, and around his neck and head.

"I am coming right out there," his lips said rapidly, when he got close. His three wire arms were all tangled up with two bundles of the wire gadget. His three eyes swung to them with a gesture.

"Transition mechanisms for you," he said. "I'll bring them out to you."

Tubby, with the excited, trembling professor clinging to him, stood waiting. Impulsively Tubby reached down to touch the metal man, but his hand went through him as though he were a ghost.

The gadget on the fourth dimensional man was glowing now. He became hazy, as though he were going to fade away. Then he began to materialize.

"The transition!" the professor murmured with awe. "Don't you see, Tubby? In his world all particles of matter vibrate differently from ours. He's changing the rate of vibration of his body and everything in its aura and electronic magnetic field. All of him is changing into the vibration-rate of our world."

"You're telling *me?*" Tubby said. "*I* doped this out. Watch me get us to that gold."

The fourth dimensional man beside them was dim now, but solid-looking. He had drifted upward so that his feet were on the laboratory floor. They could hear the humming of his wires. Then the humming stopped and his voice sounded—a queer, rapid-fire little voice with a twang to it, like a vibrating wire.

"Here I am," he said. "Put on these mechanisms and we will go into my world."

It was very easy, and it only took a minute. The wire gadget on Tubby felt light, but it made him tingle when the current went into it. His senses reeled. But then he was all right; and he stood holding himself firmly until presently the wires stopped glowing.

"Here we are," the metal man said briskly. "Now what do we do?"

Nothing looked very different from before. But everything felt different. The shadowy laboratory floor seemed tenuous through Tubby's knees. He was standing on the grassy slope. No question of it now.

"Follow me," Tubby commanded. "Gettin' that gold is easy. Just watch me."

THE strode down the slope, with the professor tremblingly at his side and the metal man bouncing along with them. It was a brief but weird journey. The laboratory building was lost in the air behind them now. In the street a phantom taxicab went soundlessly right through Tubby. It gave him a start, but he couldn't feel it, or hear it.

As they descended further, the big shadowy walls of the vault were all around them. Phantom rooms and corridors. Shadowy guards in uniform paced the corridors. As Tubby crossed the bridge over the little brook, he walked up to one of the ghost guards and poked his fist through the fellow's face.

"That for you," Tubby chuckled.

But the ghost guard paid no attention.

They were going down the second slope now. In a moment they were inside the gold-laden vaults! Inside the impregnable vaults—with the gold. And all the guards were outside the huge steel doors!

But it was all ghostly. The trembling professor reached impulsively to touch the gold. But his fingers went right through it.

"Oh dear," he wailed. "We're just as bad off as ever."

"Don't be dumb," Tubby said. "This is easy. Hey you, wire-man—turn on these gadgets again."

The transition back to the three dimensional world only took another minute. The steel floor of the vault-room was solid under their feet now; its steel walls were solid around them. The gold was here with them, solid and real. Tubby's hands reached for the gold; he ran the coins through his fingers.

"Did I pull it off?" he whispered triumphantly to the professor.

"You're wonderful," the professor agreed.

"Now what do we do?" the metal man popped.

For a moment the three conspirators stood together, planning it carefully. Tubby showed them exactly what to do. In a corner of the vault there was a pile of little white canvas bags. They'd load the gold coins into them. Carrying the bags, they'd make the transition back to the fourth dimension—climb up the slope, into the space of the professor's laboratory—and then make the transition again to their normal world.

"An' there we are, with the gold," Tubby finished triumphantly. "It'll take several trips to get it all, but what do we care? We got lots of time."

Soon they had filled up all the canvas bags they could carry, about eight apiece.

"Well, here we go," Tubby said. "Hey you, metal man, you gotta help us again with these mechanisms. Turn on my switch. I ain't quite got the hang of it yet."

The metal man's grid-face wasn't expressive enough for them to notice anything queer about it.

"All right," he said. "Steady now."

He reached to Tubby's and the professor's belts with two of his hands simultaneously. With his third hand he pressed his own switch. The transition back to the world of the fourth dimension began.

"Swell," Tubby murmured. It didn't feel so queer, this time. But it looked as queer as before—ghostly outlines of the interior of the vault, all mixed up with the ghostly fourth dimensional trees, the grassy slope and the bridge over the brook.

SUDDENLY the metal man sprang into action. Abruptly, with amazing strength, he seized the bags of gold which Tubby and the professor were carrying. He snatched them and dropped them to his feet. Released from the magnetic aura of the mechanisms, they floated down like empty sacks.

"You talk about money and getting rich," the metal man hissed. "That means nothing to me. But a durable, ductile metal that you can make into wires—that's marvelous. Most of our metal is used up, making us. And what we've got left isn't very ductile. And it isn't durable. It shortens our lives horribly."

He hissed it out so rapidly that

Tubby and the professor could only stand by frozen.

"Why should I let you have any of this gold?" the strange entity added. "I shouldn't. I've got you trapped! We're here—halfway between your world and mine. It's a good place to leave you—forever!"

"Why—" Tubby gasped. "Why, you—"

He doubled up his fists. But the metal man was too quick for him. Two of his hands simultaneously reached for Tubby's belt and for the professor's. His fingers jerked at the mechanisms, pulled the switches off and tossed them away.

The professor screamed. Tubby felt a jolt. Two phantom worlds swooped by dizzily. Tubby had a brief glimpse of the metal man scooping up the bags of gold, shoving them under the bridge. His ghostly wire figure, keeping on with its transition into his own world, disappeared under the bridge. But his triumphant voice still was audible.

"You—stay—there—forever! You're trapped!"

Trapped. For some nameless interval Tubby felt himself being pushed and shoved by gigantic forces of warring nature.

The professor was struggling beside him; then he was gripping Tubby as they stared at the swaying gray mists where the outlines of their own world and the world of the fourth dimension were fused together. "Easy," Tubby said. "We got to get out of this."

But how? At Tubby's belt he saw where the switch had been torn away. Two naked wires were exposed. And two sockets into which they could be put. But which wire went into which socket?

It was a horrible choice. One connection would take them into the fourth dimension where the lurking metal man—and maybe a crowd of his friends—would jump on them.

The other way would take them to their own world, and safety.

"This wire goes here," the professor said.

"Not at all," Tubby insisted. "Just the opposite—this one goes here."

"Oh, dear—have it your way. I hope you're right," the professor agreed finally, with a slight shrug.

It certainly was a horrible choice.

"Here we go," Tubby said.

The wire touched the socket. There was a blinding, dazzling flash of light. Tubby just had time to realize that they weren't going either way, but were blowing everything up! And then his senses slid into oblivion.

HE couldn't feel anything at all. No—that wasn't quite right. He could feel that one of his eyes ached. It had been hurting for a long time. His hand fumbled at his forehead. Queer—dying in this explosion had removed his third eye. There was no third eye here now—his forehead was perfectly smooth.

He felt a weight on his chest and legs, as though all the gold in the world was piled there. Then dimly he heard a voice: "He's comin' to! He's all right, Jake."

Was that Pete's voice? What had happened? Oh yes, he remembered now—a tree had sliced the car in half. It was the car that was lying on him. He struggled to heave it off.

"You're all right, Tubby," Jake said. Jake and Pete, in the dimness of the woods beside the road, were bending over him. The car was wrapped around a tree. But nobody was hurt, except that Tubby had a lump on his head and his eye was swelling.

They waited on the road, but no car came along. "Well," Tubby said at last, "looks like we gotta walk toward Fort Knox. Am I right?"

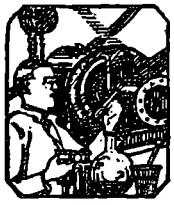
Disconsolately they trudged along.

"Your left eye's closed," Jake said. "You musta got a bump. I was thinkin' about our argument—"

"With one eye," the second man put in, "*he* said you can only see two dimensions."

"I was thinkin'," Jake insisted. "One eye shows two dimensions. Two eyes show three dimensions. Now if we happened to have three eyes—"

"Shut up," Tubby said. "With three eyes you'd see too much." He was thinking of the gold. "Hey," he said out of a silence. "Hey Jake, when we get to town let's have a hamburger. I'm hungry. Lend me a nickel, will you?"



Science Questions and Answers

THIS department is conducted for the benefit of readers who have pertinent queries on modern scientific facts. As space is limited, we cannot undertake to answer more than three questions for each letter. The flood of correspondence received makes it impractical, also, to promise an immediate answer in every case. However, questions of general interest will receive careful attention.

THE PHENOMENA OF PRESSURE

Editor, Science Questions and Answers:

Is it true that extreme pressures produce fantastic results when applied to very ordinary things? Can your very informative department supply me with any facts about such happenings?

T. L.,
Los Angeles, Calif.

Professor P. W. Bridgman of Harvard, famous for his discoveries about the way water and common metals act when subjected to pressures of hundreds of tons to the square inch, recently told the American Institute of Mining and Metallurgical Engineers that he has increased the working range of his apparatus. He can now squeeze things with a force as high as 50,000 atmospheres or about three-quarters of a million pounds to the square inch. An entirely new world has been opened. It is a minute world as yet, a world measuring just a few cubic inches in volume, a world in which such weird phenomena are observed that an imaginative mind wonders what the conditions would be on a planet where the atmosphere presses on everything as mightily.

Even in our world of ordinary pressures we find that familiar things assume different forms. Thus phosphorus may be yellow or red. Carbon may be a diamond or a lump of coal, or a bit of graphite. Professor Bridgman found that with his new squeezing apparatus he can produce allotropic varieties of bismuth, gallium, calcium, strontium and caesium, which we never see. Ice floats in everyday life because it is lighter than liquid water. It violates the rules, in a sense. Professor Bridgman's latest work shows that ice floats purely by accident; that is, at low pressures only. When the pressure is high enough, it melts with an increase in volume, just as it should.

Nearly all chemical elements expand when they melt. But in Professor Bridgman's world of high pressure bismuth and gallium behave as water does. That is, they contract in volume. Increase the pressure up to 13,000 atmospheres for gallium and 25,000 for bismuth and both behave normally, meaning they expand when they melt just as ice expands into water.

Professor Bridgman found that steel was too weak to withstand the pressures created in the apparatus. To prevent the walls of his cylinders from bursting he applied pressure from the outside and increased it as the internal pressure rose. His pressure cylinder, tapered like a rubber bottle stopper, is pushed with ever increasing force into a sort of tapered bottle neck. The piston that does the actual pushing is carboloy, a tungsten carbide used in making the tools required for die-cutting.—Ed.

SUPER-SPEED

Editor, Science Questions and Answers:

How about clearing up a seeming inconsistency in your magazine for me? In Arthur K. Barnes' novelet, THE HOTHOUSE PLANET, the author made a reference to the deer-bot fly, claiming that it traveled at a speed of about 800 miles an hour. Yet, in last month's SCIENCE QUIZ, you made the statement that the speed attributed to the deer-bot fly is fallacious. What is the real lowdown?

B. U.,
Republic, Washington.

Dr. Irving Langmuir, associate director of General Electric's research laboratory and Nobel prize winner, has smashed the reputation of the deer-bot fly, which has repeatedly been held up as something which has far outstripped man's puny efforts to become flight-speed champion of the world. Top speed of airplanes now is about 440 miles per hour. This fly, it was asserted, had a speed of 818 miles per hour.

Writing in a recent issue of **Science**, Dr. Langmuir has shown that: the non-streamlined—and really flat-headed—fly at such a speed would encounter a wind pressure against the head of about eight pounds per square inch, probably enough to crush the fly.

Power consumption for maintaining a velocity of 818 miles per hour would be about one-half horse-power which, for a fly, would be a great deal. If the fly equals man in efficiency—and it doesn't seem that the fly can be more efficient than man who himself has a high thermodynamic efficiency—the fly must consume 1.5 times his own weight of food each second to deliver the 370 watts, or nearly half-horsepower of energy, such speed requires.

The higher speed attributed to the fly in Mr. Barnes' story was based on a published report of an entomologist that he had seen the insects fly past him so fast that they could be seen only as a blur, and he estimated their speed at 818 miles per hour. Laboratory light intensity measurements and calculations prove that an object the size of a deer fly is invisible at speeds of 64 miles per hour and above. A fly striking a person at such a speed would exert force of 310 pounds, or about four tons per square inch, and would penetrate deeply into human flesh—and the first such instance is yet to be reported.—Ed.

THE DENSITY OF SPACE

Editor, Science Questions and Answers:

I'm sending out a real S.O.S.—a request for some Science on Space. Recently, in your magazine, you have published information pro and con on vacuums, perfect and imperfect. How about the vacuum that is supposed to exist in space? Isn't that perfect? What do we know about the density of the ether?

R. W.,
N. Y., N. Y.

Beyond the extremes of Earth's atmosphere is an almost perfect vacuum. In between the stars, which occupy only about one billion-billion-billionth part of space, we find a few meteors, some cosmic dust, and a small number of atoms. The investigation and analysis of this rarefied interstellar gas is obviously not a simple matter. Imagine if you can, a tube one foot in diameter and fifty million miles in length. Such a tube would extend approximately from Earth to Sirius, a distance of about nine light years. According to actual measurement, the density of the interstellar gas is so low that in all this great tube would be found only one-tenth of a gram of substance, just about the equivalent of the air in your ink bottle. At first sight, it would seem impossible to study this complete vacuum. But when we study stars a hundred or more times more distant than Sirius, the effect in the gas in absorbing starlight becomes apparent.

As early as 1904, a German astronomer in Potsdam, J. Hartmann, found the first indication that space is not empty. He was studying the spectrum of a distant double star. The two stars, in revolving around each other, shifted periodically the position of their spectral lines in accordance with the well-known Doppler principle. When one of the components was approaching us the lines were shifted to the violet; when it was receding the lines were shifted to the red. One line, due to ionized calcium, did not shift at all. Since it obviously did not share the motion of the stars, Hartmann shrewdly guessed that the calcium was associated not with the star but with interstellar space.

Several years later, Dr. Edwin B. Frost, late director of the Yerkes Observatory, announced that he had found the narrow sharp calcium line in the spectra of twenty-five stars. In 1919, Mrs. C. D. Shane at Lick Observatory, found sodium lines that behaved in the same way. Since the cooler stars possess strong calcium and sodium lines of their own, the observations are best obtained from very hot stars, where the calcium atoms are so disrupted that they do not give rise to lines that can be confused with the interstellar lines of calcium.

Recent work at Mount Wilson Observatory has disclosed the presence of other elements in the spaces between the stars. In 1934 Merill found in the yellow region of the spectrum four lines evidently of interstellar character but of unknown atomic origin. In the last few months Dunham and Adams have discovered two additional lines of sodium, three lines that are probably due to ionized titanium, one line of potassium, one probably due to neutral calcium, and several more unidentified lines. Professor Saha of Allahabad has suggested that some of Merill's hazy interstellar lines may be due to molecular $(Na)_2$ and to the sodium-potassium compound (NaK).

As a result of many investigations, astronomers have been led to conclude that the interstellar gas is fairly uniformly distributed through the galaxy. Since the intensity of the interstellar lines increase with distance, the phenomenon may be used as a measuring rod to survey the more distant regions of the galaxy. In the hands of Dr. Otto Struve and Dr. J. S. Plaskett, spectra showing these lines have yielded important information about the form, structure, and the rotation of the Milky Way System. The results are the more surprising in that they have come from study of a region where the density is about one hundred million times smaller than that of the best vacuum producible on Earth.—Ed.

A ROBOT UMPIRE

Editor, Science Questions and Answers:

One of my friends claims he read an article in some technical magazine about a robot "umpire" for use in baseball. Is this on the up-and-up? It's difficult to believe that an instrument can detect the difference between balls and strikes. I'm an umpire, and I'm worried.

E. O. B.,
Baltimore, Maryland.

A robot "umpire" that calls strikes on the batter with never-erring accuracy is the latest development in baseball, it is revealed in a patent granted to John Oram of Dallas, Texas (No. 2,113,899). The "umpire" is electrically operated, is provided with sharp "eyes" and shows none of the weaknesses to which human umpires are heir.

It consists of two lights, two photo-electric cells, reflecting mirrors and an ingenious electric circuit. The robot stands near first base out of the range of the batter. One of the lights is mounted overhead and directs a vertical beam of light of the same width as home plate directly in front of the plate. The beam passes in front of the plate through a slot. Here it is picked up by a mirror and reflected to a photo-electric cell. The other light sends a horizontal beam of light across home plate to a battery of mirrors which reflects the beam to the second photo-electric cell. Thus the vertical and horizontal light beams intersect to form a "strike" zone.

Any ball that passes through this zone is a "strike" while any thrown outside is a "ball." On the battery of reflecting mirrors the inventor has shades so that the vertical height of the strike zone can be adjusted to correspond with the distance between the knees and the shoulders of any sized batter, short or tall.—Ed.

THE STRENGTH OF OUR MUSCLES

Editor, Science Questions and Answers:

They say that you can lift the world with a lever—if it were properly applied. Apropos of this, what is the leverage ability of man's own levers—his arms? What has your oracle to say about this?

E. W.,
Montreal, Canada.

Accustomed as we are to the forces which we can exert at the extremities of our limbs we fail to realize what relatively enormous forces we really have at our command. Thus if the flexors of the elbow can pull fifty pounds against a spring balance held in the hand, the muscles themselves are pulling some 500 pounds. In lifting the body, the Achilles tendon has a mechanical disadvantage. Thus if a 150-pound man can stand on one foot with another 150 pound man on his back and raise himself on his toes, his Achilles tendon must be pulling about 900 pounds.

The force which a muscle can pull depends upon the "quality" of the individual muscle fiber, the way in which it is stimulated (frequency of nerve impulses) and upon the arrangement of the fibers in the muscle. The long arrow muscle composed of many units in series provides a small force with large shortening while the broad short muscle, like the glutaeus (upon which we sit) composed of many units in parallel, gives a large force with a small shortening. The force of the glutaeus has been estimated at 1,450 pounds.

That the arrangement of fibers is not the only factor which determines the force is shown by the reported performance of a chimpanzee who grasped a rope attached to a spring balance which was passed into her cage and without apparent effort registered a pull of 1,260 pounds, an amount 3 to 4 times as great as a human athlete of like body weight could produce, and even greater than the area of the muscles would predict.

Similarly, the force exerted by a single frog muscle fiber is far less than that exerted by a human muscle fiber of the same cross-section. While the force in general is proportional to the cross-section of the fibers, there is evidence that the quality of the fibers varies widely in different species.—Ed.

Knighthood in Flower—But in New Armor!

THE ROBOT AND THE LADY

By MANLY WADE WELLMAN

Author of "Dream-Dust from Mars," "When Planets Clashed," etc.

NO, it wasn't ridiculous, not to a man who has built robots all his life. This motorized dummy, which I'd been perfecting since 1945—for ten years—would do what I dared not.

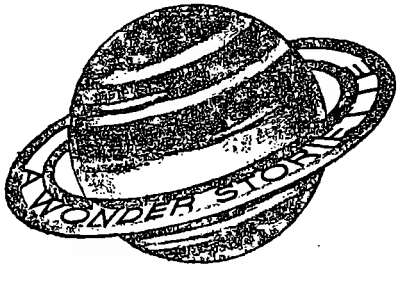
Out of the trunk he came, piece by piece. I fitted him together on the hotel bed, dressed him in gray slacks and blue jacket, knotted his red tie. I combed the dark curls back from his perfect brow. He was the replica of my handsomest and dullest student at Harvard.

"You'll do," I said aloud; I often speak to my robots.

For three years I'd been writing to my only important colleague in the field, Miss Muriel Winthrop. It began with my note of praise for her findings anent artificial ganglia. She answered cordially by return mail. After that we corresponded steadily.

Our letters progressed from informal to friendly to affectionate. And we'd planned to meet today in New York, in De Kalb's Restaurant on Forty-seventh Street, each wearing a white flower. And we'd both more than hinted at the extra-scientific relationship we hoped that meeting would bring about.

But who was I, scrawny, fluffy-headed Alvin Peabody, to go romance-seeking with a flower for guide? How would I fare on what students call a "blind date"? My prize robot, tall, dashing, would speak and act for me. Into his buttonhole I slid a fresh white gardenia.



Then I turned to where, on the desk, I had set up my controls. To my ears I clamped receivers, upon my eyes I bound the gogglelike televisors that would coincide my viewpoint with that of the robot. A transmitter would place my voice upon those sculptured lips. My hands touched a great keyboard, whence, perfect through long practice, I could direct lifelike motion.

My toe pressed a switch. At once my vision-point changed. I seemed to sit on the bed's edge, gazing through the robot's pupils. I touched the keys, and rose to my—but that was an illusion, born of years of such experiments. I remained silent, but the robot rose. I moved it across the floor, closed its fingers around the doorknob, and set it out into the hall.

My hearing, vision and awareness went along with that excellent imitation of a young Adonis; went down the elevator and out into the street. I made the thing delay at the curb to let a taxi pass, then I trotted it across, and reached the fateful restaurant. Through the open door I guided myself—that is, the robot—and set it down at a corner table.

In less than a minute she appeared.

I KNEW her by the gardenia, twin to mine, on the shoulder of her green coat. She was extremely tall and youthfully curved, filling that coat

to snugness. Her face when it turned, proved to be pink and white and faultlessly oval. Her lips glowed beet-red, her nose was straight and Greek. Upon her elaborately waved flax-blonde hair rode an absurd patch of a hat. She saw me, and approached. I drew my robot courteously to his feet, and those slant eyes of hers—they were green as the sea—were on a level with the eyes of my robot.

"Miss Muriel Winthrop?" I inquired. "I am Dr. Alvin Peabody. Won't you sit down?" She did so, and I sank the robot back into its chair.

She asked for a clover blossom. While it was being mixed, we exchanged conventional remarks about our journeys, the city, the weather. Then she spoke, abruptly and even sharply:

"Do you remember your last letter, Dr. Peabody?"

"Of course," I replied nervously. I had expressed eagerness, almost tenderness, in that note—but I had never dreamed of this towering paragon, so like an adventuress in a television comedy. She might have pleased the student who had sat for my robot; I was of a different taste. "Of course," I said again, very dutifully. "Toward you I entertain the highest—"

"Not that part," she interrupted. "I mean the formula for plastic imitations of human flesh."

"Yes, yes, I remember." I was proud of my successes with mingled silks, starches and dyes; as a matter of fact, my robot's face and hands were constructed of such material.

"You will please repeat that formula, sir, fully and exactly."

She was coldly commanding, and I was taken aback, then angry. I narrowed the robot's eyes and set its jaw.

"Just what do you mean, Miss Winthrop?" I demanded icily.

"I mean to expose you," she snapped. "You aren't Dr. Alvin Peabody."

I almost reeled at the controls. I fear that the robot sagged in its seat, opened its mouth stupidly. Muriel Winthrop's red lips curled.

"I've seen Dr. Peabody, in a recent television lecture. He's no barbered, tailored lump like you; he's a refined, scholarly-looking gentleman, about forty years old, with gray hair and spectacles." Her voice grew triumphant. "Explain this imposture, young man, or I'll call a police officer."

THE ironic farce was over. I explained, fully and abjectly, through my robot's trembling lips.

"I daren't ask you to understand or forgive," I managed to conclude.

"I—understand," she quavered. Her head bowed. "Alvin—Dr. Peabody—*this* is a robot, too."

"What!" I gasped.

"I felt shy and inadequate, like you. So I sent this latest model of mine. And I—the real I—am sitting at the controls, around the corner in my hotel."

It was my turn to stare and wonder.

"I'm different entirely," she choked on. "Quite small—"

"Thank heaven," I chimed in. "I'm no more than medium-sized myself."

"My hair's red—"

"I dislike blondes," I assured her.

"And my nose turns up, with freckles on it—"

"Ravishing!" I leaned my robot's face across the table. "Wait a second, Muriel Winthrop. We'd better start over again."

Her robot's face came near. "You mean—"

"We'll go back to our hotels and get rid of these dummies. Then come here ourselves, to this very table. We can do it in fifteen minutes."

"Make it ten," she breathed.

I hoisted my robot to its feet and called to the waiter for the check.

READ
THRILLING WONDER STORIES
EVERY ISSUE

The SCIENCE FICTION LEAGUE

A department conducted for members of the international SCIENCE FICTION LEAGUE in the interest of science fiction and its promotion. We urge members to contribute any items of interest that they believe will be of value to the organization.

●

EXECUTIVE DIRECTORS

●

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THRILLING WONDER STORIES has long been receptive to the work of new science fiction writers. During the past two years, for example, we have published stories by many authors new to this field. Carl Jacobi . Frederic Arnold Kummer, Jr. . . Paul Chadwick . . Henry Kuttner . Robert Moore Williams . Anthony Rud Allan K. Echols—the list is a long one.

Professional science fiction writers are made and not born. Readers of science fiction often make the best writers of fantasy, we have discovered.

The science fiction story is a very specialized affair. The author must be well-acquainted with his subject. He must be meticulously careful as to his scientific trimmings, for there are thousands of readers ready to challenge his slightest departure from accepted theories!

If an author has brand-new ideas that can be presented logically, his next problem is to present them dramatically. And that's a tough job! Too many writers drop into the pitfall of spilling so much scientific data that human interest and story values are overlooked, and a cold, uninspiring narrative emerges.

CAN YOU WRITE A STORY?

THRILLING WONDER STORIES is looking for new writers from among its thousands of readers. We want stories from readers who have never written a word for professional publication. And we will pay the same rates for these stories as we do for all our professional writers! It doesn't matter who you are—your story will get the same reception that is accorded to our most famous writers.

Our requirements are simple. Type your stories on regular typewriting paper. Doublespace between lines. And enclose a stamped, self-addressed envelope for the return of your manuscript if unavailable.

MOST POPULAR STORY IN AUGUST ISSUE

Here, in each issue, THRILLING WONDER STORIES announces the most popular story in the preceding issue. Novelet, short story, or short short—no matter what it is, your comments will decide.

August's favorite story, based on an analysis of all letters to the editor, was:

VIA DEATH
A Short Story by
GORDON A. GILES

Second and third places, respectively, went to FREDERIC ARNOLD KUMMER, Jr., for THE EXTERMINATORS and HENRY KUTTNER for DOOM WORLD.

Which do you consider the best science fiction story in this issue?

Stories may be anywhere from 1,000 to 10,000 words in length. Any theme is permissible. Stories of robots, biological discoveries, interplanetary travel, future sports, time-traveling, the fourth dimension, giant insects, etc., are all acceptable.

Naturally, originality of subject will be the most important requisite. If you have a good idea don't hesitate to write your tale right now. If it needs a little brushing up for publication, the editors will be glad to help. And if you can give your story a surprise ending, a *real* surprise ending—it will help lots.

So—uncover the typewriter and start pounding. Mail your stories to AMATEUR WRITERS' EDITOR, THRILLING WONDER STORIES, 22 W. 48th St., N.Y.C., N.Y. We shall endeavor to present one amateur writer's story in each forthcoming issue of T.W.S. until further notice.

JOIN THE LEAGUE!

Join the SCIENCE FICTION LEAGUE! It's a live-wire organization of science fiction's most ardent followers. Members get together for discussions of scientific nature, have scientific hobbies, and correspond with one another.

Just fill out the membership application provided on this page. There are active members and chapters in every part of the globe.

To obtain a FREE certificate of membership, tear off the name-strip of the cover of this magazine, so that the date and the title of the magazine show, and send it to SCIENCE FICTION LEAGUE, enclosing a self-addressed, stamped envelope.

An attractive membership card, suitable in size to fit your wallet, together with a list of the membership rules, will be sent to you.

CHAPTER NEWS AND GENERAL ACTIVITIES

The Fourth Eastern Science Fiction Convention

Over 100 fans, readers and writers of science-fiction gathered at Slovak Hall in Newark, N. J. to attend the Fourth Eastern S. F. Convention. The convention was called to test the advisability of a world convention in 1939 and this was proven.

Chairman Moskowitz opened the meeting with a speech of welcome. The minutes of the Philadelphia Convention of October, 1937, were read but not corrected. Milton Rothman of Philadelphia, gave a speech comparing the rise of science-fiction with that of music and predicted a Golden Age soon. He made a request that science-fiction stories should contain better contact with the world and reality implying the need for a better sociological background. William Sykora, who had been chairman of the Second Convention, then spoke about science-fiction and about the proposed World's Fair Convention. A proposal to appoint a committee to handle this affair was unanimously tabled when Donald A. Wollheim pointed out that there was already such a committee in existence appointed last year and not in any way responsible for this present convention.

John W. Campbell, Jr., author of the well-liked Penton-Blake series in THRILLING WONDER, then spoke and suggested a plan whereby two or three new fan magazines should be created. The next speaker was Mort Weisinger, associate editor of THRILLING WONDER STORIES. Weisinger spoke of the magazine's plans for the future, and gave some advance details on the new sister magazine contemplated. This was taken by the convention as easily the best news of all. Questioned from the floor about the Science Fiction League, Weisinger stated that it would be supported with increased vigor and life. Chairman Moskowitz then read messages from the editors of the other two magazines.

The meeting was recessed for the showing of motion pictures. Three shorts were shown: —"The Einstein Film," an old time pen-and-ink comedy called "A Trip to Mars" and another comedy called "Wireless Crazy." The first reel of A. Conan Doyle's "The Lost World" was shown, but since it was getting late, the film was stopped until the evening. Due to other causes, it was never shown.

A buffet supper of sandwiches and light drinks was then brought in and consumed.

[Turn Page]

APPLICATION FOR MEMBERSHIP

SCIENCE FICTION LEAGUE

Science Fiction League,
22 W. 48th St., New York, N. Y.

I wish to apply for membership in the SCIENCE FICTION LEAGUE. I pledge myself to abide by all rules and regulations.

Name
(Print Legibly)

Address

City

State Age.

Occupation Hobby.

I am enclosing a stamped, self-addressed envelope and the name-strip from the cover of this magazine (tear off name-strip so that the name THRILLING WONDER STORIES and the date can be seen). You will send me my membership certificate and a list of rules promptly. (Foreign readers must send an International Reply Coupon, or American stamps, with their applications or they cannot be accepted.)

10-38

During this period much fraternizing went on between editors and fans.

The meeting having been called to order again, Sykora usurped the chair and from the rostrum introduced various well-known persons in the audience. Many of these gave brief talks or comments. Among those called on were Leo Margulies, Editorial Director of THRILLING PUBLICATIONS, Otto and Jack Binder, L. Sprague deCamp, Frank Belknap Long, Jr., Milton Kaletsky, James Taurasi, Richard Wilson, Jr., and other prominent fans.

GREATER NEW YORK CHAPTER

Meeting of June 5, 1938

The June meeting, attended by the largest number of science fiction fans thus far (16), was opened by the Secretary, who read aloud a letter to James V. Taurasi, Chapter Director, from Mr. Leo Margulies, Editorial Director of THRILLING WONDER STORIES, authorizing the change of name from the Queens to the Greater New York Chapter of the Science Fiction League. The new charter, also sent by Mr. Margulies, was displayed.

New members include John Giunta, amateur fantasy artist, Jack Rubinson, Cyril Kornbluth, Chester Fein and Daniel C. Burford and David H. Charney, who are also amateur artists. Charney, Fein and Kornbluth are late of the Washington Heights SFL.

It was decided that the election of officers of the Chapter shall hereafter be held semi-annually. At the second election, this month, James V. Taurasi and Richard Wilson, Jr., were reëlected to their posts respectively, Director and Secretary-Treasurer. The office of Librarian, being a volunteer task, will continue to be in the capable hands of Robert G. Thompson. By unanimous consent Herbert E. Goudket, prominent amateur photographer, was appointed Official Cameraman of the Greater New York Chapter.

A recess was hurriedly called when it was discovered that the rain had let up for a moment to allow the sun to break through, and the members assembled outdoors while Goudket snapped a group photograph. Goudket volunteered to incorporate this snapshot into an article that will appear in the June JEDDARA (GNY official organ), which will give a short history of the Chapter to date. This procedure will give an idea of how Goudket's proposed magazine, SCIENTI-PHOTO, will look.

William S. Sykora then spoke at length of the wish voiced by John W. Campbell, Jr., at the Fourth Eastern Science Fiction Convention (held in Newark, N. J., on May 29, 1938), that there be issued three, at the most, semi-professional s-f magazines, designed to acquaint the so-called Outer Circle of fantasy, approximated at five thousand readers, with the intimate Inner Circle of intensely active fans who, at present, number about 75 to 100. Since the two men were able to contact one hundred or so for the Convention, said Sykora, twenty times that should be capable of interesting a very large number in active science fiction.

Fantasy enthusiasts residing in New York City and neighboring communities are invited to attend our meetings, which are held the first Sunday of each month at the home of the Director, James V. Taurasi, at 137-07 32d Avenue, Flushing, New York. Further information may be had from Richard Wilson, Jr., Secretary, at 86-10 117th Street, Richmond Hill, New York.

The third issue of JEDDARA, the Greater New York Chapter's official organ, is now ready. It contains 10 large-sized pages of science-fictional material of interest to all fans. Copies may be secured from the Secretary at the above address, for 5c, postpaid.

OKLAHOMA CITY CHAPTER

Jack F. Speer, with the cooperation of Edgar A. Hirdler, Kenneth Jones and Paul Ishmael, all of Oklahoma City, Okla., are actively engaged in the formation of a SCIENCE FICTION LEAGUE CHAPTER in their city. Will readers of THRILLING WONDER STORIES desirous of joining please communicate with Mr. Speer? His address is 137 NE Park, Oklahoma City, Okla.

LOS ANGELES CHAPTER

Meeting of 5/19/38 called to order at 9:20. The Secretary, Roy A. Squires, and his friend, Perry L. Lewis resigned after reading some unacceptable minutes. A news sec in the name of T. Bruce Yerke was appointed. (And is now pounding out this news.) New business about an old subject was brought up by member F. J. Ackerman in the form of a letter from a very, very prominent scientifiction author of long, long standing, and at present one of the leading figures in the field. He requests that his name be withheld. (Not Burks, or Keller, you'd never guess it.) He commented on Imagination! and gave vent to some very valuable criticism, suggesting that since the mag is mimeographed, it can serve more people than the other fan mags, and that we should enlarge our reader capacity and interest. This led to a free-for-all on the topic. Charles D. Hornig, now residing in L.A. gave some very valuable advice, backed by his years with Gernsback and the League. Meeting ended at 10:10.

MEETING OF JUNE 2, 1938

Meeting called to order at aprox 9:20. Attendance of only 16. Fred Shroyer, popular member, departed eastward, hoping to be back in the fall. The last hope of Mr. Dilbeck just about vanished, after weeks of expectation. Bob Olson sent note that he was hooked up to some sort of plastic chemical company, and if we could assure him an attendance of 50, he would come to the club and give us a highly interesting demonstration of chemical magic. Nothing more of interest occurred and the meeting adjourned shortly. New Member this meeting—Ray Harryhauser.

All Scientifiction fans in and around Los Angeles are urged to try to join the League's only California Chapter. We meet first and third Thursdays at Cliffton's Cafe in the Little Brown Room, third floor rear, at Seventh & B'way, you can't miss it. Don't be bashful, just walk in, we don't bite. I recall the first time I walked in a year and a half ago, B-r-r-r, and now I wouldn't move from L.A. without greatly missing the gang. You can get in touch with the mob by addressing the Director, Russel J. Hodgkins, 1903 W. 84th Place, Los Angeles, or the Secretary, T. Bruce Yerke, 1256 N. Kingsly Drive, Hollywood, California. Telephonic communication can be had by calling F. J. Ackerman, FEderal 2231.—Report by T. Bruce Yerke, Secretary.

NEW MEMBERS

United States

Abraham Schwartz, Brooklyn, N. Y.; Philip Garland, Jr., Tacoha, Washington; Marvin Langford, Pagetta, Idaho; Alfred H. Bowles, Jr., Spokane, Wash.; Fred W. Irwin, Jr., Denison, Texas; Bernard Goldstein, Bayonne, N. J.; Russell E. Powell, Southern Pines, N. C.; Ernest Guidal, Great Neck, N. Y.; Robert A. Wolf, Louisville, Ky.; Raymond Heaton, Anacosta Sta., Washington, D. C.; Stanley Gould, Petaluma, Calif.

Elmer Romigh, Houston, Texas; Leo J. Strevel, Tulsa, Oklahoma; Stanley Klinger, Tremont, Pa.; Charles A. Becker, Webster Groves, Missouri; Leonard Ramanette, Ventura, Calif.; Samuel Zebrowitz, Bronx, N. Y.; Jim Spooner, Fort Pack, Montana; Azygous, Brooklyn, N. Y.; Walter Oberg, Chicago, Illinois; Van Woodward, Gulfport, Miss.; Maurice W. Wayne, Bronx, N. Y.; Stanley Hansen, Millbrook, New York; Reid Gardner, Cedar City, Utah; James H. Gardner, III, Salt Lake City, Utah; Z. Kosowski, Chicago, Ill.

Norman F. Ames, Philadelphia, Pa.; Burton Anse II, Superior, Wisconsin; E. E. Shackelford, Kansas City, Mo.; Bert Barron, Chicago, Ill.; E. L. Sheers, Chicago, Ill.; Edmond Lillie, Memphis, Tenn.; Robert Mastell, Hibbing,

Minn.; Harold Klein, Los Angeles, Calif.; Wm. Martin, Colorado Springs, Colo.; Walter Patton, Jr., Chicago, Ill.

NEW MEMBERS

Foreign

Frank C. Lennox, Durham, England; Alex Scott, Edmonton, Alta, Canada; R. H. Harding, Maylands, Western Australia; Alan Robson, Gateshead 8, England; D. Lorimer, Bradford, Yorkshire; M. D. Pratt, Bedford, England; R. Shuman, Woodstock Cope Town, South Africa; John Green, Cheshire, England; M. Burford, Warwickshire, England.

Ian Stiven, Toronto, Ontario, Canada; Bruce Horrison, Lakemba, Sydney, N.S.W. Australia; E. G. Blenman, Ishington, Newcastle, New South Wales; Herbert Ballock, Eastville, Bristol, England; Lee Edwards, Paris, France; R. Greening, Viauville, Montreal, Prov. Que.; Herbert Albert Gilby, London, S.W. 16, England; Herman Genschorek, Vancouver, B.C., Canada; Lawrence A. Thornton, Mayfair, London, England; W. V. Symes, Hartley, Plymouth, England.

ON THE BOOKSHELF

MATHEMATICS FOR THE MILLION. By Lancelot Hogben. Norton. $3.75.

MATHEMATICS is about as close to a universal language as anything will ever be. If science fiction is bringing the facts and theories of modern science to readers the world over, mathematics is equally understandable to a Hindu, a German, or a Japanese, even though presented in a French or Russian journal.

It is mathematics which is today doing the pioneer work in the physical sciences. Mathematics proved the practicability of the space rocket and discovered Pluto. Einstein's theory of relativity, quantum mechanics, the wave theory of the atom, the expanding Universe—all have grown out of mathematical visions.

Now a book has appeared which makes the fundamentals of mathematics understandable to anyone who can follow a logical argument, and by doing so gives science fiction authors a new springboard from which to dive into uncharted depths of the imagination.

The chapter on statistics will give you an idea of why Professor Rhine's seemingly prosaic experiments at Duke University seem to be incontestable proof of telepathy and clairvoyance.

Mathematical stories in science fiction have been few and far between, if we except yarns dealing with the much over-rated "fourth dimension." Conscientious authors may need their math, and need it badly, in figuring out some of the interplanetary gyrations of their characters, but that is all behind the scenes. Now, maybe, there will be a new deal for science fiction, and with the groundwork in *Mathematics for the Million* a million science fiction fans will clamor for bigger and better paradoxes.

Mr. Hogben's book is a passport into a new work which exists all around you—the world of number and measurement.

—P. S. M.

Are You Worried about holding your job?

WHEN one of your fellow-workers is "let out"—does it make you wonder whether *you're* next?

Does the fear of having to go job hunting—perhaps this very next week—sometimes spoil your whole day—now and then keep you tossing restlessly in the night?

It's high time you stopped!

For it's so easy to stop if you'll only give yourself real *cause* to feel secure in your present position.

But be sure that it is real cause. See to it that your value to your firm really does become so great that they'll feel they must keep you.

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☐ Commercial Law	☐ Stenotypy
☐ Industrial Management	☐ Business Correspondence
☐ Business English	☐ Salesmanship

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The Story Behind the Story

LETTERS from our science fiction audience serve as a permanent source of amazement to the editors of this magazine. For instance, we had a few faint misgivings about Frederic Arnold Kummer's novelet, THE EXTERMINATORS, in our last issue. We didn't doubt that it was a good, almost a perfect yarn, but we wondered if most people would like it as much as we did. To our surprise, practically everyone did. Mr. Kummer's mail has been reading like the wildest dream of a blurb-writer.

We wondered, too, about Arthur K. Barnes' HOTHOUSE PLANET when we first published it. It was a great story, we knew, but did our readers want a series centering about the exploits of a—girl? An avalanche of letters answered us, howling for a continuation of the series. Similarly, we crossed our fingers when we ran the first Penton-and-Blake novelet. Would science fiction followers go for a wisecracking duo of scientific adventurers? THE BRAIN PIRATES, the fifth in this series by John W. Campbell, Jr., appears in this month's issue, and the reception accorded its forerunners is eloquent testimony as to the popularity of his characters.

THE THOUGHT THIEVES

The possibilities presented by a race of animals adept in the use of telepathy are endless—and amusing. In his latest Penton-and-Blake novelet, THE BRAIN PIRATES, John W. Campbell, Jr. dwells on the more amusing angles of the problem. Here're a few words from the author himself on the subject of telepathically adapted creatures.

Telepathy is old and much-used in stories. It's not so much that every author thoroughly believes in, and expects the eventual success of this method of communication, but that every author believes in and knows darned well he has to have dramatic action. And surely, every person who has ever studied a foreign language knows the utter lack of dramatics or action in the learning of a stranger's language.

That alone, I think, is reason enough for the barrage of telepathy. But there's more, too. The giraffe has no effective vocal cords. The only known way to get a rabbit to use the equipment he has is to kill him, slowly and lingeringly. When the rabbit is convinced he is dying, and the pain is quite unbearable, he'll use his apparatus. Not before. If two mammals of Earth, our own planet and own animal-type, don't and practically can't speak, the chances are pretty fair we'll meet a race that can't, or at least doesn't.

And how about a race equipped with two larynxes A race that could sing and talk chords? Man couldn't possibly learn that language.

But Lord, telepathy ought to be good for something more than practical uses! We have a world full of vocal-equipped animals. How about a world full of telepathically equipped animals? Then it's a fact that about the best known—and practical today—method of invisibility is hypnotism. Hypnotize the subject, tell him he cn't see Mr. Xenephon Plantagenet, and he **can't** see Mr. Plantagenet.

The havoc a mischievous, telepathic animal could create in a civilized world!

SPACE QUEEN

If Miss Gerry Carlyle won't watch out, she'll find Mr. Carlyle—we mean Mr. Strike—stealing the show! The little lady is so busy hunting boomerang whatnots for the London Interplanetary Zoo she probably hasn't noticed the notches on Tommy's belt. At any rate, they both share one common interest—and that is to kick Nine Planets Films out of the Solar System, if possible!

Here's Arthur K. Barnes back with SATELLITE FIVE and an interesting letter concerning the genesis of his newest novelet:

The idea germ for SATELLITE FIVE was born in what I think I may claim to be unique circumstances. During the terrible floods of last March I was living in the mountains not far from Los Angeles, and happened to find myself right in the middle of the very worst of it. My only near neighbor was completely wiped out—lost home, car, and everything and his caretaker was killed—and my own place escaped annihilation only by a miracle. For four days, since my own place was still in a dangerous spot, all those trapped with me in that particular region were forced to live in a one-room cabin—two women, four men, and two dogs. It was bitterly cold, and all of us envied the chap with the dogs because they slept close to him and kept him warm. We cussed him out good-naturedly and someone said, "What we need right now instead of those pooches is a couple of healthy dragons. They'd warm this place up!"

In the midst of all that terror and destruction and hysterical womanhood, the old think-tank began to function. And Cacus, the fire-breathing monster, was born. Though the fire-producing apparatus as revealed in the yarn may seem simple, I assure you it took quite a bit of digging to make it scientifically possible.

Later, while still marooned in the mountains, food and messages were dropped to us from airplanes (whose pilots had an uncanny knack of dropping their sacks right into the river!). For the most part they were volunteer pilots with ancient crates I wouldn't dare sneeze it. That gave me the idea for the "condemned patrol" on Ganymede.

The rest of the story was mostly elbow grease and conference with my local scientific encyclopedia, Al Mussen, whose invaluable assistance certainly rates notice here.

I really enjoyed writing this yarn, and giving Gerry Carlyle a run for her money. I only hope it gives some of the readers an enjoyable run for their money, as well. If they like it, then I'm happy.

SUB-CONTINENTAL FORCES

Every editor is too lazy to write. Or maybe he's afraid his stuff will collect rejection slips. It's different with us. We do our writing vicariously.

Suppose it snowed in New York City on July Fourth? And suppose, at the same time, it started snowing in Death Valley, the hottest place in the country?

We thought there might be a story locked in that suggestion. Arthur J. Burks thought so too, and his novelet, THE CHALLENGE OF ATLANTIS, is ample proof. Here's what he has to say regarding the story's development:

This is the "story behind the story" of CHALLENGE OF ATLANTIS. Last summer,

in a little out of the way library in Hollywood, I chanced upon an ancient volume purporting to be the true story of the sinking of Atlantis, Mu, and Lemuria. The story of Atlantis posed a lot of questions in my mind. Had the continent sunk without warning? Had wise men known the sinking was due? Had it gone down slowly, giving inhabitants time to take to boats? What had happened to those people? Had some of them reached the mainland, to be our own forebears? And, most intriguing from the viewpoint of the pseudo-scientific writer, if any had been caught on the continent when it sank, had they managed to survive—down under both the land and the sea?

Of course there was no way of knowing. The editor of this magazine asked me to do a story wherein snow fell in Death Valley in midsummer, in New York in July; wherein seasons were apparently reversed, not by an accident of weather, but by human design—and not strange humans from outside, either. Who, then? The old unanswered questions of what had happened to Atlantis, and possible survivors, came back to me, and I saw a chance to combine both pieces of business. Was it reasonable to take it for granted that survivors, multiplying down under the sea and the soil of Atlantis, had increased with the ages, to the point where they had to spread out—even to land that had risen from the deep since they had sunk beneath it? Again nobody knows, but there's the idea—and CHALLENGE OF ATLANTIS was the result.

I enjoyed writing it. I hope and trust that readers will like it. Also that they will wish to see more from the same typewriter fingers—both of them—of the co-author of this one. I say co-author because the editor had a finger in this pie, and deserves credit, even if his name isn't mentioned.

MESSAGE FROM THE ETHER

Carl Jacobi's short yarn in this issue, COSMIC TELETYPE, packs a dramatic punch . . . and offers plenty of food for thought, besides. Mr. Jacobi is a popular writer of detective and adventure fiction. We're hoping to see more of him in the future in T.W.S. Let him explain the genesis of his narrative:

I'm not sure if I can trace the actual inception of COSMIC TELETYPE. It might go back to my Fourth Estate days when I was reporter and re-write man on **The Minneapolis Star.** The Star was an evening sheet with no Sunday edition, and Saturday afternoon was known as the "dog-watch" when the staff went home with the exception of two lonely men who remained on duty in case some late news broke for the "final green." Usually there was no news. The men on the "dog-watch" sat around and watched the clock.

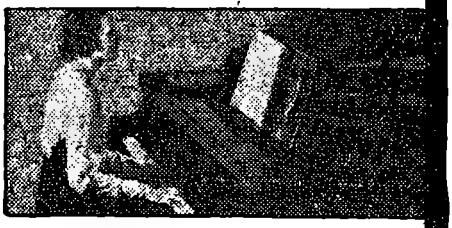
But even a clock gets tiresome after a while. I usually kept a volume of Jeans or something similar in my desk. When I tired of reading, I strolled over and watched the teletypes. They're fascinating instruments, and when one is freshly steeped in astronomical facts and postulations, the mind is apt to seize the nearest stimuli and lead itself into queer channels.

Or the yarn might go back to a local radio station, where I did a continuity serial, based on a series of INS despatches that also had come over the teletype. The script was far removed from science fiction, concerning a ghost ship or derelict that had been sighted after a half century's disappearance off the coast of Alaska. But that certain mystery that envelops all wire-messages was there.

I believe, however, that COSMIC TELETYPE had its real genesis one lonely February night at my cabin at Red Cedar Point, Lake Minnewashta. Outside a blizzard was raging. Inside the wood stove was aglow, and I sat listening to "short-wave." The last station I remember receiving was a plane calling its landing base. When I awoke the

(Concluded on page 129)

THOUSANDS HAVE LEARNED TO PLAY THIS EASY WAY..



Everything was so plain and easy. I began actual music in less than two months! My friends were astonished—they wondered when and where I had ever taken music lessons.
* Miss R. P., Southmont, N. C.

I enjoy practicing your lessons and am making great headway. I play in a church as second violinist and have also signed up with the M—— Band of Ohio, getting $2 per playing hour.
* Mr. E. C. R., Pemberville, Ohio.

** Actual pupils' names on request*
Pictures by Professional Models

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Have you
Instrument .....Instrument?.....

Name

Address

IN this department we shall publish your opinions every month. After all, this is YOUR magazine, and it is edited for YOU. If a story in THRILLING WONDER STORIES fails to click with you, it is up to you to let us know about it. We welcome your letters whether they are complimentary or critical—or contain good old-fashioned brickbats! Write regularly! As many of your letters as possible will be printed below. We cannot undertake to enter into private correspondence.

FROM THE FAMOUS AUTHOR OF THE "SAINT" NOVELS

By Leslie Charteris

In the last issue of THRILLING WONDER STORIES you asked your readers to let you know whether they wanted a new science fiction magazine. I want one. I should like it to come out weekly, and run to about three hundred pages. And I should also like to take you out in my yacht if you would like to come out and look at our flood.—Palm Springs, Calif.

FEATURES PERFECT

By Alan Saun

With the August issue of T.W.S. in my possession, I find that this magazine has completed two years under the new management. On looking through the twelve copies, I also find that each one seems to be better than the one preceding it. Now, about the August issue. "Doom World" was the best. "The Exterminators" was good, too, but its plot was rather old. The "Green Ray" was o.k., as were all the other stories. The features are all perfect, especially IF. THE READER SPEAKS should contain more letters.

Stories written by Eando Binder, Edmond Hamilton and Paul Ernst are always good, so let's see more of them in the near future. I was glad to see what the author of "The Exterminators" looked like, and wish the picture of each author was enclosed with his story. That artist Schomburg, your latest discovery, is like Marchioni, darn good! And in closing, may I beg you to make my favorite magazine into a monthly.—Toronto, Ontario.

SURPRISE

By Bob O. Vaughn

The way I started reading T.W.S. was through my father. He brought one home one night and I read it from cover to cover. I have read every issue of T.W.S. since then and think that all the stories are very interesting and contain many valuable scientific facts. In the August issue, "The Exterminators" was my favorite. The "Green Ray" was second; I think "Catalyst Planet" was far too fantastic. IF, by Jack Binder, is the most interesting department in your book. I think that the Gerry Carlyle and Tony Quade feud is an excellent idea. As for a companion mag, I am all in favor of it. I am really glad that ZARNAK is gone.

Please keep serials out of T.W.S. One of the reasons why I read T.W.S. is because of its complete novelets. Now here comes the big surprise. I am only ten years old, but I am in the eighth grade. The above confession will probably land this letter in the waste basket also. I like your covers and I find that your illustrations throughout the book are improving all the time. I hope that I shall be able to enjoy reading your book for many years to come.—287 N.W. 54th St., Miami, Fla.

TORONTO RESIDENTS NOTE

By Jack Mason

The first part of this letter covers the National Chapter of the Science Fiction League. Now in reference to my Certificate of Membership, I am a member in good standing of the National Chapter, No. 2445. But otherwise from owning a pretty card, of which I am very proud, my plight is no better than when I joined. Now as a remedy to this situation, may I request the formation of a Toronto Chapter? I think I have noticed the names of a few Torontians in your new member lists. Therefore, would you kindly ask any Leaguers that reside in a reasonable distance from my home to communicate with me so that we may organize the Chapter for this winter?

Now as long as that is off my chest, I'll start a little criticising. Please encourage your writers to let themselves go. I mean in reference to space yarns. Let the characters get out into the stars—but don't let them take space ships, weapons, etc., for granted. Leave nothing half-done. Do it the whole way, and that brings me to Gordon A. Giles. His latest series, the "Via's", are examples of what I mean. Those stories are the sanest interplanetary yarns ever written, worked out logically and thus realistically. Conclusively, how about a monthly? Or as an alternative, a companion magazine to run longer novels and serials. I think that the omitting of the latter is one of the

greatest faults of T.W.S. To get back to the first part of the letter, please publish this letter as soon as possible so that our Chapter may be formed as soon as possible. —133 Isabella St., Toronto, Ont.

"STEINMETZ" BY A SQUEEZE

By Glen Broughman

Having just finished the June issue of T. W. S., I'm sitting down to write this letter to you. The June issue was generally good, however some stories stood out with some features above the rest. J. S. Avery seems to have spoken my mind in the last two issues concerning this magazine. I certainly think that we need a companion magazine or for T. W. S. to go monthly. It's tough to wait two months before I can get hold of my favorite magazine. I also agree with him about changing the size of the type in THE READER SPEAKS so that more letters can be printed. As to the stories in the June issue, "The Man Who Looked Like Steinmetz" was first by a narrow squeeze with "Murder in the Void" right behind it. Then comes "Terror in Utopia," "The Great Illusion," and "Time On My Hands," the latter having an unusual ending. The SCIENCE QUIZ and IF are both interesting features. I have been reading science fiction for seven months, but I've found your mag to be the best, so continue to keep up the high standards that you have maintained.—Arcanum, Ohio.

CARLYLE GOES ON FOREVER

By J. J. Demaree

Hey! A "sequel" means second and concluding installment. You don't mean to say "The Dual World" is the last of Gerry Carlyle, do you? Just when I was getting to like A. K. Barnes' style and the way he puts in those thrusts of sly, dry, humor when you least expect 'em. And just when the feud with "Hollywood on the Moon" is waxing furious. . It ain't right. We want more! More Barnes, Binder, Campbell, Giles, Williamson, and especially more T. W. S. either quarterly or monthly or something! —Los Angeles, Calif.

OUR SEVEREST CRITIC

By Doc Lowndes

After careful analysis of the now completed Volume 11 of T.W.S., one cannot help but notice the continuous flow of minor improvements in each issue, until more and more one is forced toward the conclusion that it isn't a bad magazine unless you read it. The main reason for the present billet d'amour, however, is your note in the S.F.L. column pertaining to reprints. Kindly awaken one of your henchmen and have him mark another check in the registry of those favoring reprints of the shorter classics from the old Wonder Stories. Knowing well your penchant for selecting the best material, one can assume that no really important

(Continued on page 120)

Sell 19 Features in Six Months

"I have sold, up to date, nineteen features to the Detroit Free Press and have been made their correspondent here," writes Mrs. Leonard Sanders of 218 Union St., Milford, Mich., on completing the N. I. A. course. Her skilful handling of feature stories was the reason given by the editor for her appointment. Mrs. Sanders' first feature was sold less than four months after she enrolled with N. I. A.

How do *you* know *you can't WRITE?*

Have you ever tried?
Have you ever attempted even the least bit of training, under competent guidance.

It is seldom that any one becomes a writer until he (or she) has been writing for some time. That is why so many authors and writers spring up out of the newspaper business. The day-to-day necessity of writing—of gathering material about which to write—develops their talent, their background and their confidence as nothing else could.

MORE NEW WRITERS MAKE SAT. EVE. POST THAN EVER BEFORE

During 1937, editors of THE SATURDAY EVENING POST bought more material from new and unknown writers than ever before in their history, according to TIME (Jan. 10, 1938)—147 in all—33 short stories, 4 serials and 110 non-fiction. Up to this time the average has been 10 to 12 manuscripts a year from new writers. The POST is but one of hundreds of opportunities for talented newcomers in the field of writing if they have learned their craft thoroughly and practically.

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Many people who *should* be writing become awe-struck by fabulous stories about millionaire authors and, therefore, give little thought to the $25, $50 and $100 or more than can often be earned for material that takes little time to write—stories, articles on business, fads, travels, sports, recipes, etc.—things that can easily be turned out in leisure hours, and often on the impulse of the moment.

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We have prepared a unique Writing Aptitude Test. This tells you whether you possess the fundamental qualities necessary to successful writing—acute observation, dramatic instinct, creative imagination, etc. You'll enjoy taking this test. Just mail the coupon and see what our editors say. Newspaper Institute of America, One Park Avenue, New York.

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(Continued from page 119)

classic will reappear. However, when I recall the wealth of utter tripe that the old magazine printed, despite its triumphs, a reassuring note steals over me.

A few of these gems sprinkled liberally through successive issues will go a long way toward making the more recalcitrant members of your reading audience appreciate the material you give us today. There's one consolation. In the old days, I could seldom if ever pick up a copy of Wonder and read it through without stopping to cogitate: now, it can be done every time. Although, some of the things in this last volume have been dangerously close to being competent science-fiction.

There was Frank Belknap Long's "We, the Invisible," for example: well masked as it was in his own curious style trimmed carefully to fit your requirements. And, in this issue, all six of the short stories had interesting ideas behind them. With the exception of those by Williams and Cross, however, the handling was such lovely hashwork that these ideas were nicely glossed over. "Wings Across the Cosmos" could not be called the best story in the issue, for a thing has to be good before something else can be termed better; this tale did come the nearest to being good. As far as stories go, Kuttner's and Barnes' series are both high up in entertainment. So what?

The prize story in volume 11, was Clark Ashton Smith's "Dark Age". Smith has always rated high in Wonder, despite the ofttimes perilous concessions he makes.

Leaving the dead mean of most of your stuff, it's about time readers got together on a booby prize for the rankest material. Honors for this volume seemed to hang in balance, for awhile, oscillating between Messrs. Binder and Fearn, but at last we decided to hand the silk-lined tomato can to Binder for "Life Eternal." Congratulations, Mr. Binder: you have set a new low. Rank amateurs will be hard put to it now, for it is extremely doubtful whether their hopeful efforts will be quite as bad as your very finished product. Mr. Fearn gets honorable mention, however, for "Lords of 9016" outfearns Fearn for sheer incoherence, improbability, and illogicality unto itself. You, sir, have given a sublime illustration of H. G. Wells' famous statement concerning science-fiction: "When this kind of thing is attempted by clumsy writers who do not understand its elementary principles nothing could be conceived more silly and extravagant."

These elementary principles, I might add, are the appeal to the human sympathy and logic unto its own particular fantasy. There is not one paragraph in "Lords of 9016" where there is the slightest momentary illusion of reality. Barnes' and Kuttner's and Campbell's series, for example, are well-written enough to the extent that the reader can set aside incredulity at whatever fantasy the author is propounding and see the scenes and situations presented. *Greenwich Hospital Ass'n., Greenwich, Conn.

ATTENTION, SPOKANE READERS

By Alfred H. Bowles, Jr.

For many years I have been a reader of science fiction. It would seem that after reading this type of literature for so long, that it would become stale with me, but I must say that the stories in your magazine are just as thrilling and novel as when I was first initiated into s-f. The illustrations in your magazine seem to be done with care and are most imaginative. The various departments in your magazine also add to its uniqueness. By all means give us the companion magazine! It will rescue science fiction. Give us long complete novels by our old favorites and try to get the artist Paul. The old quarterlies will live again!

I have never seen letters from readers in Spokane in your column. I would like to get in touch with League members in my vicinity to start a chapter. Well, more power to THRILLING WONDER STORIES! You have one of the most interesting magazines out. Also enlarge the READER SPEAKS COLUMN even if you have to use small type.—2408 N. Walnut Ave., Spokane, Washington.

CANDID COMMENT

By John Smith

Picture if you can a tiny sheltered nook, shadowed by a semi-circular arrangement of low-hanging, dark green trees, their reflection mirrored on the surface of a limpid pool. Flowers of a varied hue bloom in unbounded profusion along the bank, and among the roots of their larger brothers; among the branches can be heard the murmuring of birds, occasionally broken by a soft splash in the pool. Overhead the sky is a dark blue, sprinkled with a generous portion of cream-colored clouds, which looked as if they had spread their sails and were drifting across a magnificent body of water. That, dear Editor, is the feeling, and sense of thought, that I was thrown into when I noticed the new Wonder Stories being issued under your well known title.

Don't let yourself be fooled by irrepressible critics. The stories are as good, if not better, than those printed in the well recalled "good old days"! The majority of your readers are the ones that you do not hear from. They undoubtedly like to take your magazine and read it for relaxation and enjoyment. They are not interested in a too technical discourse in science; they enjoy a story for its plot and action. Don't get me wrong, however; they do want a certain amount of logical presentation of certain ideas. If I'm wrong, let's heap bricks upon my head till I groan beneath the weight. Here's another gigantic thought. What is smell? Is smell produced by an indefinite number of minute particles which are in a colloidal suspension in the atmosphere? Is the smell of smoke the smell of tiny carbon particles; or what is it? Getting down to the question, may I ask: What do you smell when you receive an odor from

(Continued on page 122)

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Made especially for home use, attached in a jiffy without tools. Has top, for you to put your own programs at home, parties, club affairs, etc. Barrels of fun! Easy to operate.

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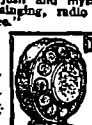

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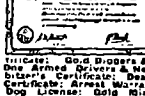

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White Duck Yacht Cap, superior quality duck, white celluloid cap, gold cord, brass buttons and red, white and blue rosette on front. Sizes 6 7/8 to 7 3/8. Price postpaid 35c

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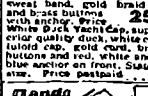

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It looks like a deadly weapon, but it is merely a novel Cigarette case. Better than the usual thing in many an awkward encounter. Great fun "sticking up" your friends. Every gun man and practically all the trigger and the slide flies open, disclosing cigarettes. Price 25c

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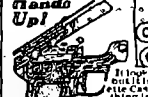

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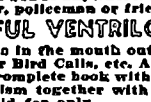
COMPLETE CAMERA OUTFIT 35c



Although this outfit is somewhat elementary, it is quite efficient, and will take excellent pictures. Takes pictures 2 1/2 x 2 1/2 inches, sharp and distinct. Good lens, simple finder and fairly effective shutter, time and instantaneous. Complete in one package. 1 package of printing paper, 1 developing powder, 1 fixing powder, 1 printing frame, glass top, and a supply of chemicals for developing, fixing and toning the finished pictures, full printed instructions so simply written that a child cannot fail to understand. Complete, for only 35c. Postage, 10c extra for postage and packing. Extra film 10c per package of five films. Extra printing paper, 10c per packages.

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(Continued from page 120)

some object? Or do you smell anything. Maybe I'm a big smell at the present; I don't know.—615 North A St., Monmouth, Illinois.

HIS NAME'S MURPHY

By James S. Avery

Duck! Here I am again with my bi-monthly missive: a little late perhaps, but here nevertheless. This time I'm crusading enthusiastically—you guessed it—reprints. I would have mentioned this matter before, but I thought it hopeless. But there's no holding me back now. I'm not going to undertake to tell you what stories to use, but I will mention just one—"A Martian Odyssey," the masterpiece of the late Stanley G. Weinbaum. I can think of no other tale that has done so much for science fiction. It should be available for your thousands of new readers who may never get a chance to see it otherwise. I have no doubts that you will be swamped with requests like this, so let's have them real soon. That is all I insist upon—good luck to you.

And now for a few scattered and rapid-fire comments concerning the June issue. The cover: 'nuff said. But as a sfn friend of mine remarked, "that's the skeleton in T.W.S.'s closet. May we never see another like it! My vote for the No. 1 tale is Williams' "Man Who Looked Like Steinmetz." Outside of being the best story of the issue, it has the most distinctive title of any yarn for the past few years. As the situation is now, it will be a race between Williams and Peterson as the most popular new author of 1938, although Polton Cross offers mighty stiff competition.

How about giving us a little dope on your new artist. His name is Murphy, isn't it? Why, oh why can't artists sign their names plainly. It may not be the fashion for them, but it will save many a fan a restless night. There're only about four in the whole field whose signatures are legible. When are we going to get that small type for the READER SPEAKS column? Even the longest letter in the last issue was shorter than the shortest of several years back. And where have all the old fans gone to?—55 Middle St., Skowhegan, Maine.

FROM ACROSS THE POND

By Ken Chapman

With reference to my last letter, I would like to complete my observations on the June issue of THRILLING WONDER STORIES. The story, "The Man Who Looked Like Steinmetz" was, I found, very excellent science fiction, and I was glad to see that the author had the pluck to leave his readers in the dark at the conclusion. Room for a sequel, I guess! "The Dual World" was Barnes as good as ever. This series seems to have caught on properly on this side of the water, and you must surely

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keep it going. "Wings Across the Cosmos" was a quite different type of story, and that one I thoroughly enjoyed. I should like to see more of my countryman, Polton Cross, in the future — he's certainly promising.

The next two stories, "Years of Unreason" and "The Great Illusion" were hardly up to the usual high standard, both being more than a little hackneyed, but Mort Weisinger's short-short made up for a lot. It was a very clever yarn, indeed. I thought the best in the issue was "Terror in Utopia," which was both well written and thought provoking. Nice work, Mr. Ernst. Generally speaking, your illustrations are on the up-and-up, although I didn't like Wesso's pics for "Year of Unreason." However, he made up for it elsewhere in the magazine. Morey is doing his best work for you. It looks like the Morey of the late twenties.

All your departments keep up a high standard of quality, although it is generally agreed on this side of the water that the current READER SPEAKS lacks the usual polished missive from Doc Lowndes, and thus falls below the usual par. The campaign organized by the S.F.A. for more votes on the companion magazine question is bringing in a lot of votes, and I will let you have a packet of them next time I write. —59a, Tremaine Road, Anerley, London, S.E.20. London, England. (Executive Secretary of the Science-Fiction Association.)

VIVISECTIONIST

By Jack C. Dean

As I reached for paper to type this letter on, I thought of some words I read a few years ago— "—I raved, I wrote fan letters, I frothed at the mouth . . . "

Says the mad professor: "Aha! Great! In the last stages of scientifictionitis; trying to write stories by himself . . . "

"But," I protested to myself, the editors do want letters, and I am sure that the later stages of that malignant malady can't possibly develop with such bad tasting medicines around as 'The Great Illusion.' Go ahead and write."

So with that internal conflict settled, I shall continue in compliance to the editorial requests. I would enjoy reprints of not too recent stories. It doesn't mean anything to me when you say "name the stories you'd like to read again." I'd like to read the stories that were adjudged the best when I was too young to read s-f. Of course, the opposition will complain of having to reread old stories, but that's just selfishness. They wouldn't have to read them. I'm still chirping for a quarterly. It would relieve the present dearth of s.f. magazines. A bimonthly is pure pain to a reader who likes his atom blasters, fourth dimensional horrors, etc.

What a few man-sized novels wouldn't do toward fattening an otherwise skimpy diet. The new SCIENCE QUIZ interested me

(Concluded on page 124)

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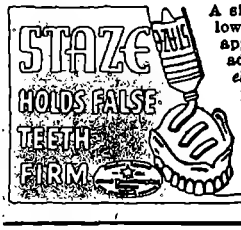

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(Concluded from page 123)

because after I got through it, I found that I didn't know so much after all. I am glad to see that it will return. Anyone who says that "The Man Who Looked Like Steinmetz" wasn't the best June story, doesn't know what he is talking about. Of course, "The Dual World" will be voted the best, but that's all a mistake. I know I'm right. "Terror in Utopia" was a logical story. The rest of the stories I'll ignore. Now I must retreat and wait for that distant date when I will get another issue to vivisect alive and hand back to you in little pieces.—Red Bank, New Jersey.

TWICE A GENIUS

By Dale Tarr

Your science quizzes agree with me very much. In the August issue the item, Scopes, was the only thing on which I fell down. I have been a genius twice according to your ratings on separate sections of the quiz. In the issue you say that Bode's law is a fallacious theory. I disagree. That opinion is based on the apparent exception which Neptune makes to the law. Pluto fills in that space very well and therefore Neptune is not a natural resident of the Solar System. That possibly is easier to admit than to ignore the compliance of the first seven planets with it, seeming to me, too great a coincidence.

"Via Death" by Giles takes the issue. I liked the illustration form for "Doom World"—Schomburg is a good illustrator. You don't pay enough attention to your covers. The rest was fair reading except for Cummings and Palmer. The first was poor and the second indicted on a charge of idea abduction with not enough good handling to warrant the taking. You really ought to publish this for Bode's benefit. I've wanted to discredit the discreditors of his law for a long time.—S.F.L. 2110, R.R.2, Cloverdale, Ind.

BROWN DOES THE COVERS

By Erskine Walker

Hoo-ray for Will Garth! After reading THRILLING WONDER STORIES ever since its first issue, I consider Will Garth's "Great Illusion" a real gem of science fiction. This is the type of story that was printed in the good old days. "Hollywood on the Moon" takes the cake in the April issue. By all means, publish a companion mag to T.W.S. This would squelch the numerous queries for a quarterly and would also take care of the bi-monthly problem of waiting two months. About T.W.S., it is definitely improving. The last two issues have been extremely interesting. Willy Ley's article on submarine activity, "Conquest of the Deep," is the type of article that I have been anticipating for a long time.

IF by Jack Binder is a definite improvement over ZARNAK. The latter may have had its good points, but in my estimation it belong on the Sunday comic page and not in a science fiction magazine. Now for the brickbats. Who is the mysterious cover decorator? His name in the June issue was not visible inside or outside. Perhaps he is ashamed of the monstrosity he created. Aside from this minor irregularity, the magazine is on the upgrade to the top. As for the republishing of the old science fiction classics, I think it is a grand idea.—2519 Post St., Jacksonville, Fla.

SCIENTIBOOK REVIEW

LOST ATLANTIS, by James Bramwell. Harper & Brothers, 1938. $2.75.

IN spite of the fact that a bibliography of books on Atlantis, compiled in 1926, includes some 1,700 titles, it has until now been next to impossible to find a good, modern book on the subject, written in English. Now Mr. Bramwell brings us a sound and readable review of the Atlantis question which remedies that situation and, perhaps, paves the way for a serious consideration of what Atlantis may have been.

Properly speaking, the whole Atlantis story hangs on two dialogues by the Greek philosopher, Plato—the *timaeus* and the unfinished *critias*. Plato may, as his character Critias reports, have been retelling an Egyptian legend, or he may have been making up a new Utopia to embody his philosophy, and lending the story verisimilitude by such realistic touches as every science fiction author now uses.

There is no evidence to show which is the case. All the rest of the Atlantis literature consists of attempts to prove, disprove, or modify the Atlantis story given by Plato, in the light of scientific or pseudo-scientific explorations, divine revelations, and other common sources of enlightenment. It is this evidence which Mr. Bramwell discusses competently and interestingly in his book.

There are three common methods of searching for the lost Atlantis. The first of these is the historical — searching through the works of other early writers for allusions to what may have been the same legend or tradition to which Plato referred in detail. If you do not demand too much of this sort of research, you may come out rather well satisfied, for Mr. Bramwell concludes that there probably was an Atlantean tradition going back into the Stone Age, which Plato embellished in his two dialogues. Next science is brought into play, and here the battle of the giants begins, for

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"science" of one sort or another has "proved" Atlantis to be almost everywhere on Earth — in America, in the Sahara, in Spain, at the bottom of the English Channel, or the Bay of Biscay, or the Mediterranean, and of course in the Atlantic.

Archeology in particular has been guilty of making numerous brash statements which were subsequently torn to little bits by savants of the opposition — probably because an archeological investigation is every bit as ticklish a proposition as a sensational murder case, and evidence may be largely a matter of interpretation of facts that cease to exist immediately they have been dug up. Taken all in all science has neither proved nor disproved the Atlantis story, and probably will not for some time.

The third field of investigation — one which ardent readers of science fiction will doubtless find quite familiar—is that of the intuition. There is a large body of seekers after the occult, arcane wisdom of the ages who know all about Atlantis. Unfortunately, their knowledge disagrees not only with the scoffing savants but with Plato's own account. Wonderful knowledge it is, too, full of lost empires, ancient races, wonderful civilizations, and all the trappings of the best science fiction, and Mr. Bramwell really goes to town in his discussion of it.

His pleasant method of building up an argument as strongly as possible and then knocking the pins from under it is at its best as he goes into the revelations of the mysterious "Akashic Records" and their story of the multiple races of mankind—the Lemurians, the Rmoahal, the Tlavatlis, the Toltecs, the Turanians, the Semites, the Aryans, the Akkadians, the Mongols, and those which are yet to come.

Every serious science fiction fan will read "Lost Atlantis" with enjoyment and argue the better for it. There is, alas, no real bibliography, but there are enough references to other books so that the energetic reader can run down some of the fascinating material which has been written on the subject.

There is no reference to Colonel Churchward and his Mu — a rather serious oversight since, to the intuitionists at least, Mu and Atlantis are all part of the same cosmic story, while in fact they seem to meet over the bridge of Le Plongeon's "translations" of Maya glyphs. But on the whole, this is the book which a great many of us have been looking for, for a long, long time.

—P. S. M.

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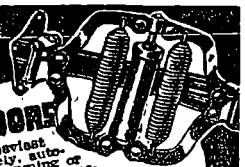

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ANSWERS TO SCIENCE QUIZ ON PAGES 72-73

POSITIVE OR NEGATIVE

1. True.
2. True. It applies exactly to any process in physics, chemistry, biology, whether on the earth, within the earth, in the sun, or in the stars.
3. True.
4. False.
5. True.
6. True.
7. False.
8. False.
9. True
10. False.
11. True.
12. False. The photosphere is the sun's surface.
13. True.
14. True.
15. False. It increases nearer the Poles.
16. True.
17. False. It rests between beats.
18. False.
19. True.
20. False. The earth receives but one-two-billionth of the entire solar radiation!

TAKE A LETTER

1. a
2. c
3. a
4. d
5. b
6. d
7. c
8. c
9. d
10. a

SCRAMBLED STAR-DUST

1. Ceres
2. nebula
3. Sirius
4. albedo
5. parsec
6. eclipse
7. Polaris
8. Antares
9. asteroid
10. Arcturus
11. solstice
12. satellite
13. meteorite
14. Andromeda
15. perihelion
16. Betelgeuse
17. planetarium
18. spectroscope
19. constellation
20. interferometer

SKY-OLOGY

None! It would take 720 moons placed in contact side by side to make a circle round the sky. To cover the whole sky with moons would take about 200,000. Since there are about 6,000 stars in the whole sky visible to the naked eye, there would be more than 33 moons for each visible star, so that there is a chance of less than 1 in 30 of there being a visible star behind the moon.

MISSING LINKS

1. **Mesozoic.** Classication of Geologic time according to eras.
2. **Argon.** The inert gases.
3. **Thallophytes.** Principal groups of the Plant Kingdom.
4. **Recognition.** Four processes into which psychologists divide memory.
5. **Titan.** The moons of the planet Saturn.

WHO'S WHO

7, 2, 12, 3, 5, 10, 4, 11, 9, 1, 8, 13, 6, 14, 15.

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Will exchange stamps of any kinds since I have more than I need. I want B. & W. coupons, United profit sharing coupons and cigar bands of any kind. M. A. Leppin, 606 E. Capitol, Washington, D. C.

Have electric trains and equipment, books, toys, games, violin, sporting goods, etc. Your list for mine. M. Eptstein, 2953 Ruckle Street, Indianapolis, Indiana.

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BEST FUN, FICTION AND FOTOS *IN*

THE STORY BEHIND THE STORY

(Concluded from page 117)

fire was out, the cabin was icy, and I had the story.

As for the science, it depends on whether you agree with Einstein. If you do, you'll agree, I think, that interplanetary communication, if or when it comes to pass, might very possibly do so—broadly speaking—by way of the fourth dimension.

A word about the Hastings bridge, mentioned in the story where the character, Rane, had his automobile accident. I'm told it's the only one of its kind in the world and a remarkable piece of engineering. Maybe it is, but I for one prefer not to drive over it on a stormy night. The construction starts as a gradual slope, narrows to a one-way wooden trellis affair, and then abruptly develops into a winding spiral staircase.

I know a chap who met a bus there on a slippery Spring night. He had to back down in reverse. When he finally got on terra firma, it would have taken more than a teletype—cosmic or otherwise—to quiet his nerves.

SPAWN FROM THE SEA

FRANK BELKNAP LONG, JR., can always be depended upon to turn out a science fiction short story with a fresh slant trimmed with that important elixir—human interest. Besides offering food for thought, Long's story seems to place the old legend of the individual who wondered whether he was a man or a mouse in modern dress. Are you a man or a mouse? Read MIND OUT OF TIME.

And here's what the author has to say about the actual basis for his story:

The sea is the great mother of mysteries. The treasures which it casts up are seldom commonplace or prosaic. Even the humble cockle shell has traversed watery depths of mystery and wonder, and has a story of its own to tell. MIND OUT OF TIME is simply the curious story of an ocean-traveler a little more exotic and unusual than a cockle shell. It was suggested by an actual incident which I witnessed last summer while vacationing at Asbury Park, New Jersey.

I was idling on the boardwalk when I noticed an elderly, dignified-looking gentleman walking along the beach and stopping from time to time to poke with his cane at the wet sand. Suddenly he seemed to spy something which interested him exceedingly. He dropped his stick and fell to his knees. His hand went out. When he rose his trousers were sodden and sand-encrusted, but the expression on his face can only be described as rapturous.

I fell to speculating as to the nature of the object which had caused him to forget his dignity and his self-control. At first I thought of the strange and incredible creatures which lurk in the depths of the sea. I thought of Dr. Beebe and his great metal sphere. Then I thought of other planets and the spawn of far stars.

Since most of the Earth's surface is covered with water as sea-beach seemed the logical last port of call for a derelict from the sky. I thought of Mars and Saturn and the evening star, and the vast, foamy sweep of the constellations. And then—the twin mysteries of Time and Space dissolved about me and I was gazing through dim veils into the far, incalculable future. The sea became the last port of call for a great wonder and an eternal mystery. And that is how MIND OUT OF TIME came to be written.

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5.25-17	2.90	1.35
28x5.25-18	2.90	1.35
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31x5.25-21	2.95	1.35
4.50-17	3.35	1.40
29x5.50-18	3.35	1.40
29x5.50-19	3.35	1.45
6.00-17	3.40	1.40
30x6.00-18	3.40	1.45
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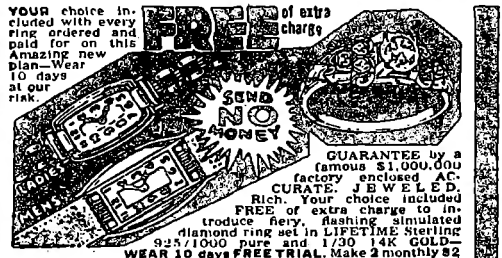

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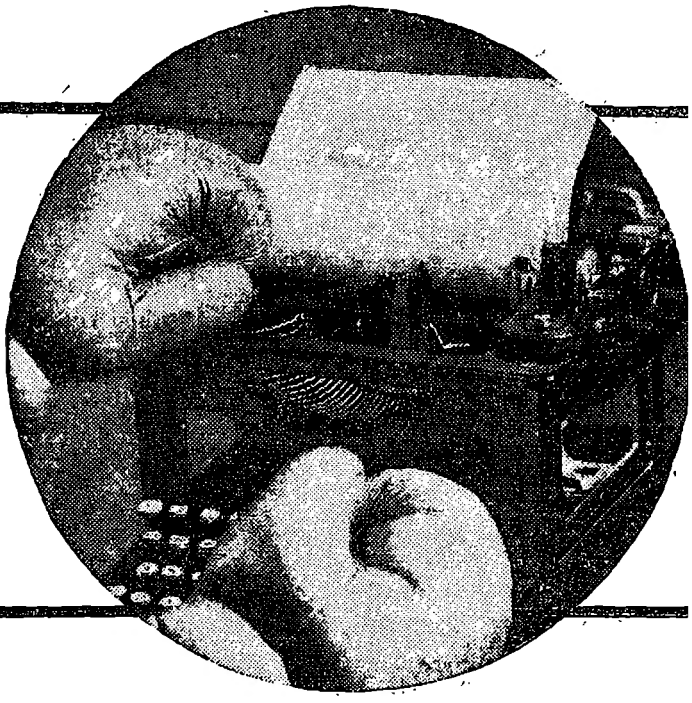

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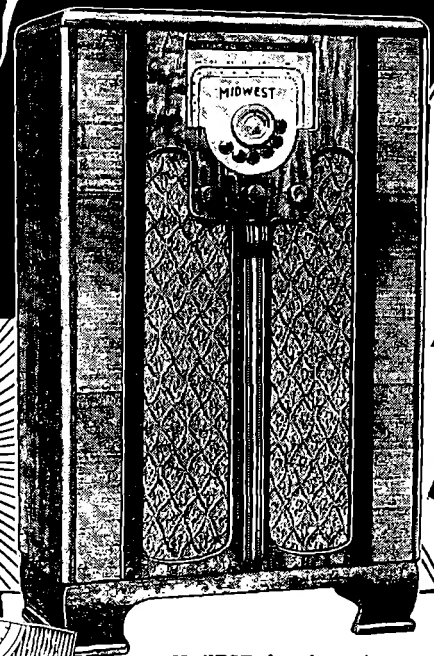

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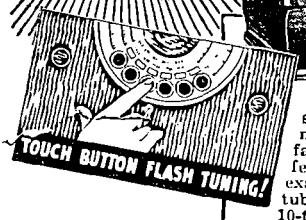

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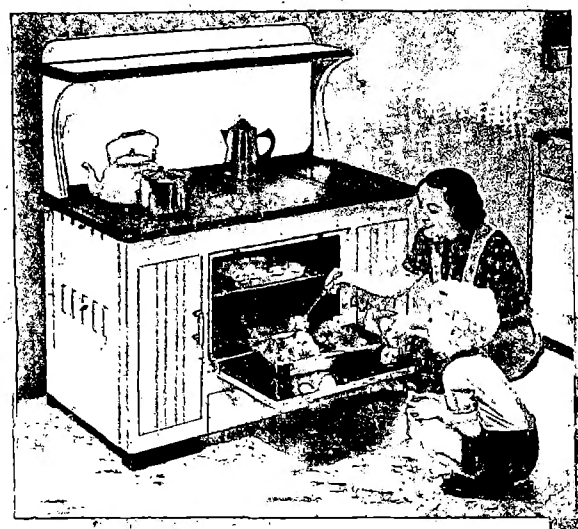

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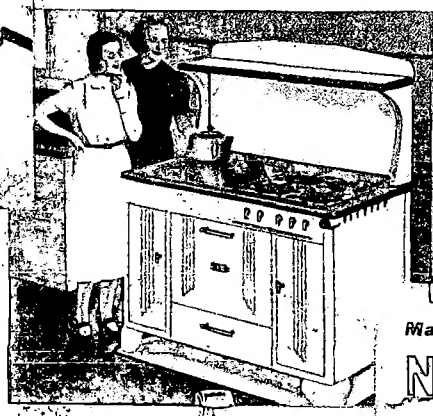

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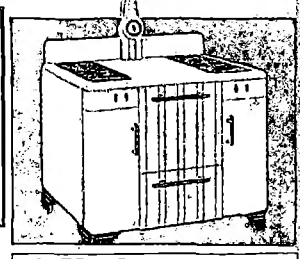

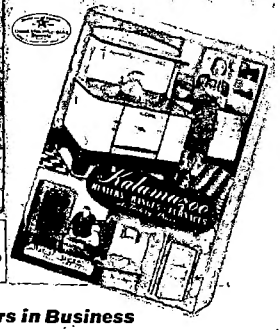

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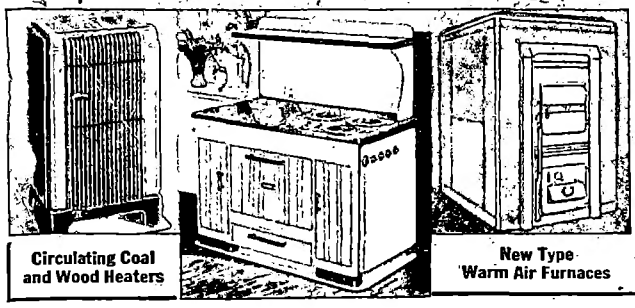

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